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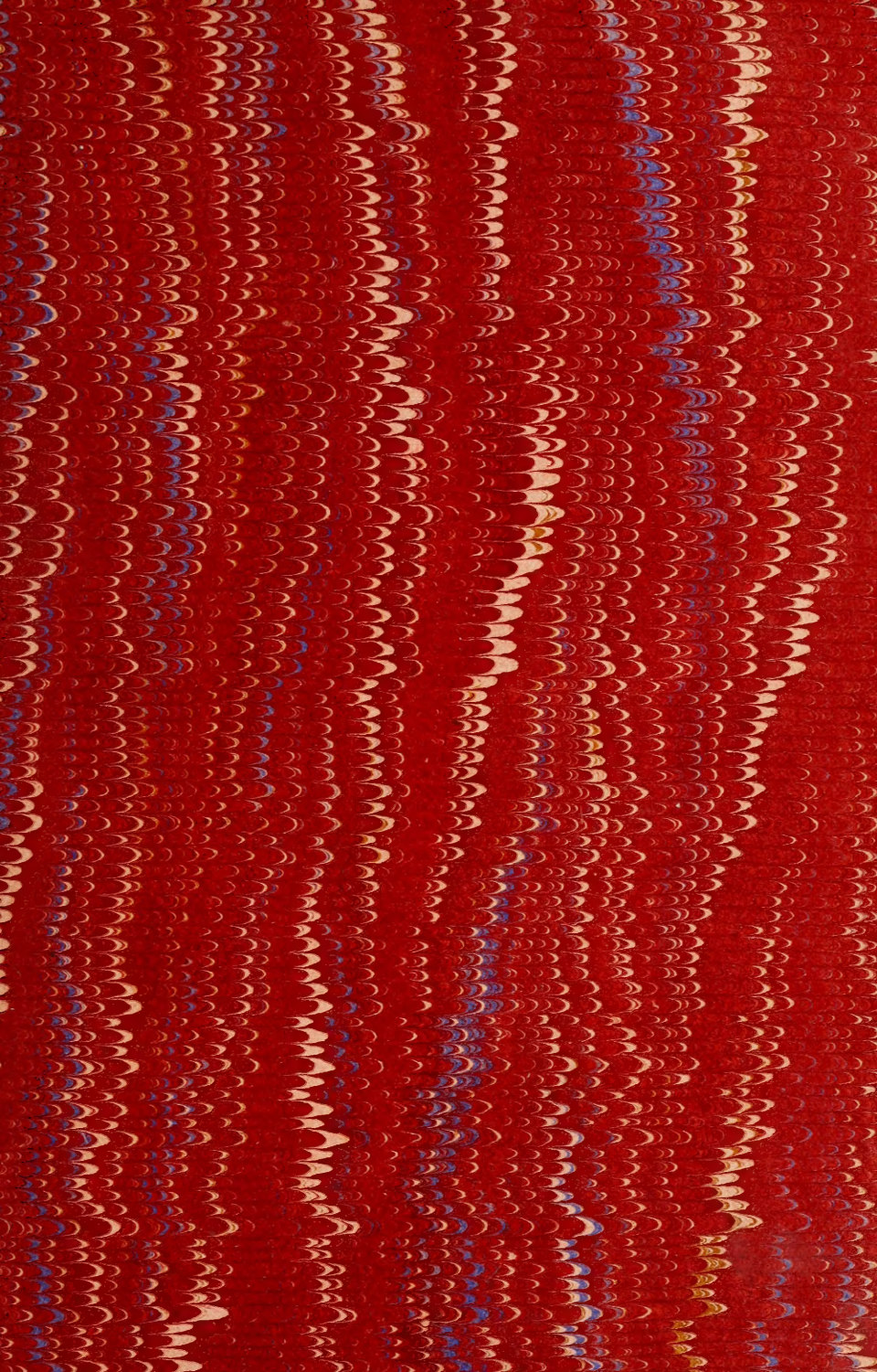
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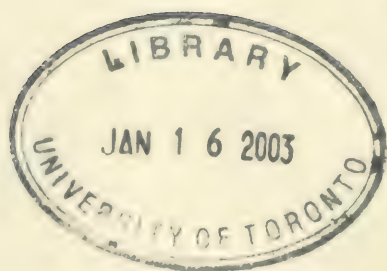
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EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES AND NEWS.

The General Medical Council.

THE May Session of the Council was as usual largely occupied with disciplinary cases. Unpleasant as these are, they form a very important part of the work of the Council for the profession. It is not only that the black sheep are expelled from an honourable profession, but the grey ones are warned, and little irregularities which may seem almost harmless are shown in their true perspective and significance.

The President's address was, as usual, admirable, and brief, putting in the clearest possible manner and the fewest possible words all the practical politics of medicine.

Perhaps the most important matter, both in its direct and its indirect bearing, is the alteration in the exposition of the law regulating the practice of dentistry. Recent decisions had, it was believed, made it clear that it was exceedingly difficult for irregular practitioners of dentistry to advertise themselves without bringing themselves in conflict with the Dental Act, which prohibits persons from advertising themselves as "qualified to practise dentistry." Decisions—apparently most sensible decisions—had been given in Court after Court that the various phrases commonly used by such persons did imply that they were "qualified" in this way, and they suffered accordingly. But the "ultimate tribunal" has decided that the term must be taken in its legal and not in its common sense; and now these persons may advertise as they please, always provided that they do not imply that their names are on the Dental Register. The only Act now remaining intact is the Veterinary Act, under which no one may hold himself out as capable in any way of treating animals unless duly registered. The result is a *reductio ad absurdum*, and we cannot doubt that this decision of the House of Lords must indirectly lead to a reconsideration of the whole question of unqualified practice.

Two years ago the Council appointed a committee on unqualified practice, which drew up a lengthy report dealing with the question in

different civilised countries. Following on the receipt of this the Local Government Board issued a circular to the medical officers of health throughout the country, asking for information as to the existence and ill effects of any unqualified practice in each district. The response to this circular was not all it might have been, some of the medical officers of health ignoring it altogether. But they reckoned without Mr. Burns; and a second circular called their attention to the fact that an answer was expected. From these answers so much important and valuable evidence has been derived that arrangements are in progress for its publication in the form of a parliamentary paper, in which form it will, we hope, do much to enlighten both public and parliamentary opinion.

By the death of Robert Koch medical science has lost one of her greatest sons, and mankind an incomparable "physician." "Physician-redeemer" truly, for in all he did and wrote he had ever in view the larger prospect of prevention of disease. He had a perfect genius for discovery on those lines.

From first to last Koch's career was remarkable. Born in a home where the *res angusta* must have coloured the life, he was irresistibly impelled by the creative force within him. The routine duties and slender resources of district medical officer did not limit his outlook. Nor did distance from the centre of things, in remote Posen, blunt his keenness or dull his zest for exact work. Down there in Wollstein—perhaps even earlier in the Clausthal days—he had his vision, and the light never failed.

Other discoverers there have been in medicine who may rank along with him. To no one may be awarded more certainly the palm of creative success. Justly has he been called the father of bacteriology, for he made it. It is not only the long list of micro-organisms with the discovery of which his name or that of his pupils is inseparably connected. There is the still more remarkable conception and construction of methods whereby these discoveries became possible. The foundations and technique of bacteriological science were in largest part his. It seems hardly needful to recall his staining methods, his solid culture media, his advances in microscopy and micro-photography, and, above all, his postulates in relation to pathogenic organisms, conceived and fulfilled with exactness at a time when the mere notion of the micro-organism was in most quarters nebulous and vague.

From his early work on anthrax—begun a few years after graduation—right up to the end, research followed research with extraordinary rapidity and variety. With what appeared to the onlooker a tangled web of threads in his hand, he had a marvellous power of concentration on the main thread. Nor was it dropped until the subject had been carried beyond the realm of etiology to the statement and, when

possible, the settlement of preventive methods. His interest was not bounded by the laboratory. He insisted on seeing the larger facts of disease for himself. While primarily a scientist he projected himself into other spheres, and, recognising whither his discoveries led, sketched in strong outline the preventive measures which must follow.

Take the great programme of work in relation to tuberculosis. There was first the discovery of the bacillus—the perfect demonstration of the organism, its character, its mode of activity—then its cultivation, then the interpretation of tuberculosis, then its reproduction experimentally, and, finally, its prevention and its cure. It was Koch who made the rest possible. And so with other researches. Throughout, there was the grasp of a statesman and the outlook of a general.

He was a simple, humble, self-forgetting man, devoted to his fellows, and to his ideal—the redemption of man from preventable disease. Towards this end nothing seemed too great a sacrifice, no price too high. The call which he heard as a country doctor compelled him to create methods to satisfy his inspiration. It led him to Egypt, and to India, and to South Africa, to see disease on the spot, that he might rightly appraise the influence of environment and other causal factors. And so he attained completeness of view and justness of judgment.

To the close, he laboured in the same spirit, stout of heart and resolute of purpose. His last illness found him busy with a programme of further activity in view of the International Tuberculosis Congress at Rome next year. Quietly the pen was laid down, and has not been taken up again. There has passed from medicine one of the conquerors of the world—a man of imperishable memory.

Alcohol and Offspring. THE investigation carried out by Miss Elderton in the Galton Laboratory of Eugenics—a research rendered the more noteworthy in that it has had the guidance of Professor Karl Pearson—is one of interest for many. The sum of it is to the effect that the children of the drunkard start life just as well equipped as their more fortunate brethren in point of physique and intelligence. Selecting two typical communities, and working-class districts in each—one being in Manchester, the other in Edinburgh—they have found some facts which are probably new to most people, even to those who have had experience in such matters. Thus, they found amongst other things that the value of the drunkard in the labour market is to the value of the total abstainer as 25s. to 26s., or, roughly, 4 per cent., a margin much smaller than is generally supposed. Regarding the children, and having only reference to them as children, for a further investigation is promised as to the future conditions of such children, it is found that while there is

a higher death-rate amongst the drunkard's children, attributable apparently to the carelessness of the drunken mothers, the mean weight and height, the general health, and the eyesight of the drunkard's offspring were distinctly better than in those of the sober. Followers of Weissmann will see in these results the proof of the failure of acquired habit to impress itself on offspring. The earnest advocates of total abstinence will, at the first blush, wish that another result had been obtained, or that it had at least been kept *perdu* for a time; but they would be quite justified in using this finding of Miss Elderton to point the moral of greater hopefulness in dealing with the children in question. The acquired habit not having been engrained, there is the more hope that it may not show itself, thus giving a more hopeful outlook for the educator. We shall look with great interest for the further investigation which is promised, but one distinction might very properly be made, namely, between the drunkard who drinks because he likes to, who has acquired and kept up the habit from his own wish, and the drunkard whose inebriety is merely an expression of a nerve instability showing in him as drunkenness, and in his brother as epilepsy, or in his sister as immorality, the inebriety which is not an acquired habit but an expression of neuro-instability. What kind of children does he beget?

Eugenics and Arithmetic.

It is generally agreed by those who have studied the subject of human inheritance that mental and moral characteristics are influenced by heredity just as directly and as distinctly as physical characters are. It would, indeed, be strange if it were otherwise. It is, moreover, agreed that mental and moral characters are subject to a far wider range of variation than are the peculiarities of body structure. Now, if these two doctrines are accepted, it becomes of the greatest interest to every community to ascertain whether the higher or the lower types are multiplying the more rapidly. For if one type increases at a quicker rate than another its characteristics will in no long time acquire preponderance, and influence the average character of the whole community. A few years ago Professor Karl Pearson published a striking essay in which he pointed out reasons for believing that in the British Isles at the present time the more desirable types are not keeping pace in their rate of reproduction with the less desirable, and the same conclusions have since been reached by others. Probably, however, few people realise what a great advantage is given to a particular type by a rate of reproduction only slightly greater than that of others. This is a point which is referred to in the very valuable work on *The Family and the Nation*, which has been published recently by Mr. and Mrs. Whetham. They show that in certain large classes of the nation each fertile marriage produces an average of three children. Now, the

Registrar-General's returns show that of four children two either die young or have no children, the other two being left to replace their parents. An average of three children per marriage, therefore, is insufficient to maintain the population. On the contrary, with this rate of increase, each 1000 persons will, at the end of a century, be represented by only 687 descendants, and at the end of two centuries by 472.

In other sections of the community the birth-rate is maintained at the level of 33 per 1000. This is 13 more than is needed to balance the higher death-rate (about 20) found in these sections. Now, of this more prolific stock 1000 will be represented at the end of a hundred years by 3600 persons; while after two hundred years their descendants will number no less than 13,000.

To put the matter in another way, these figures imply, to quote Mr. and Mrs. Whetham's words, that "the less prolific stock, if originally equal in number to the other, would be about 1 in 6 at the end of a century, while in two hundred years it would form but about 1 in 30 of the population. It would be lost in the descendants of the stocks of predominant fertility." If it be granted that the less prolific stock is on the whole of a higher type, of a more desirable type, from the point of view of the national welfare, than the more prolific, it cannot be doubted that the figures quoted are of grave, even of ominous import.

**The Sterilisation of the
Degenerate and of the
Habitual Criminal.**

ONE hears from time to time of various enactments passed by the Legislatures of American States for preventing the marriages of persons suffering from constitutional and congenital diseases, but the discussion in the Connecticut State Medical Society, as reported in the *Yale Medical Journal* for January last, reveals a side of medical opinion which is, to say the least of it, astonishing. The discussion arose on a paper entitled "Heredity and Crime: a Study in Eugenics," by Dr. Wm. A. Carmalt. It is an able paper, closely reasoned and written by a man who has not only studied his subject, but who has read extensively the current sociological and biological literature bearing on this and on cognate matters. Dr. Carmalt boldly advocates the sterilisation—under proper safeguards—of the feeble minded, the habitual pauper, and the habitual criminal. Speaker after speaker who took part in the discussion sympathised with his views.

To treat this serious discussion as a mere ebullition of irresponsible talk would be absurd, more especially when one glances at the appendix to the discussion, in which the laws of several States of the Union are quoted. Thus, the States of Connecticut, Michigan, New Jersey, North Dakota, and Delaware have on their Statute Books laws prohibiting the marriages of the degenerate: while the States of

Indiana and Oregon have in operation laws authorising the sterilisation of certain classes of the unfit.

It is no doubt desirable in every respect that persons with strong hereditary tendencies to insanity, neuroses, crime, pauperism, or alcoholism should not procreate children. It is also desirable that the vigorous and healthy members of a community should be encouraged to have a maximum progeny, but when we have admitted these propositions we have admitted all that in the present state of our knowledge we are entitled to say. To go further—to adopt the extreme measure of sterilisation—is to follow a blind impulse which, however well intentioned, may, for aught we know to the contrary, lead to disasters much more serious than the evils we are proposing to abolish. Take, first of all, the case of the feeble minded. We are here dealing with the ultimate results of a faulty heredity. The degenerative process may have begun in previous generations and slowly culminated in the present individual. The sterilisation of this unfortunate person may in some respects be desirable, but as a radical remedy for a disease of the stock it is ludicrously ineffectual. One might as well pick the diseased fruit off a tree in the hope of curing the tendency of the tree to produce this kind of fruit. What we want really is to attack the stock, but how to do so is at present beyond our power. We know that some otherwise healthy and useful members of society have a tendency to produce degenerate progeny, but without greater knowledge than we at present possess it would be absurd to attempt to interfere with the liberty of such people to procreate. Then as regards the criminal many questions of great gravity arise. We have to consider whether criminality is in a large proportion of cases not the result of faulty surroundings, and whether the removal of these surroundings would not be vastly more efficacious than such an imperfect measure as the sterilisation of a comparatively few individuals. There is also the question of our view of what constitutes a criminal, and with regard to that it will generally be admitted that opinion varies from one generation to another.

The result of sterilising large numbers of the population and turning these loose upon society could not but be attended with a lowering effect upon general morality. We are not ripe for such a drastic procedure, and its wide advocacy on the American continent strikes us in the light of being one of those undigested social programmes bred of the modern restless desire for action at any cost.

Leith Hospital.—Dr. Lamond Lackie, Assistant
Gynaecologist, and Dr. Traquair, Assistant
Ophthalmic Surgeon.

DISCUSSION ON THE ARTIFICIALLY PREPARED HYPNOTICS, THEIR USE AND POSSIBLE ABUSE.¹

Introduced by FRANCIS D. BOYD, C.M.G., M.D., F.R.C.P.,
Lecturer on Materia Medica and Therapeutics, School of Medicine
of the Royal Colleges, Edinburgh.

THERE are some, one might almost say many, who regard pharmacology as an uninteresting subject, and relegate it to the domain of "Dry as Dust." Yet even pharmacology may have its gleam of romance, and the discovery of the modern hypnotic may justly be regarded as a chapter in that romance. Chloral had been described by the chemist Liebig in 1832, but it was not till 1869 that its value as a hypnotic was realised. Like many another important discovery, it was the child of happy chance. Liebreich was working at a purely scientific question—"Whether a substance is broken up into its constituent parts before it is oxidised?" In his observations he selected chloral hydrate. On injecting chloral into animals it was found that they fell asleep. Following up this discovery, Liebreich worked out the pharmacology of chloral hydrate, and on this work our knowledge of the modern synthetic hypnotic has been built. Some of Liebreich's conclusions have been, with justice, disputed, but his monograph will, I think, remain a classic—a landmark in the domain of pharmacology.

The mode of action of the synthetic hypnotic is a difficult problem. We are familiar with the phenomena which accompany sleep, but not with the cause of sleep. We know that changes take place in the cerebral circulation and in the cerebral cortex—physical changes in the dendrites—during sleep, and those changes are probably secondary to changes taking place in the cell and in the nucleus. Sleep and waking may be regarded as the expression of the rhythmic activity of the central nervous system, and correspond to certain anabolic and catabolic changes in the cells of the cerebral cortex.

Meyer's hypothesis in explanation of the action of hypnotics is now well known, and while it will not explain the action of some, it at least gives us a working hypothesis on which to base our ideas. Briefly stated, the theory postulates that all chemically related indifferent substances which are *soluble in fat* and

¹ The introductory remarks at a discussion at a meeting of the Edinburgh Medico-Chirurgical Society, 1st June 1910.

fat-like bodies must have a narcotic effect on living protoplasm, so far as they can distribute themselves. The action will be most prominent and powerful on those cells in whose chemical constitution the fat-like bodies predominate, particularly if they are constituents of the functioning part of the cell. Having this affinity for fat-like bodies, the narcotics tend to collect in the cells of the central nervous system, and so alter their physical condition and induce sleep. The relative activity of the narcotic must depend upon its mechanical affinity, on the one hand, for fat-like bodies, and on the other, for the remaining constituents of the body, principally water—consequently on the co-efficient of solubility in a mixture of fat-like bodies and water, the strongest hypnotic possessing the greatest co-efficient of solubility in fat.

From the chemical side, the synthetic hypnotics have been divided into three groups:—

1. Those which owe their action to the presence of a halogen, *e.g.* chloral.
2. Those which owe their action to the presence of an alkyl group, *e.g.* the alcohols.
3. Those which owe their action to the presence of an aldehyde or keton group.

By combination of members of these groups new hypnotics may be formed. Now, while this classification may be excellent from the chemical standpoint, it is not of much use to the practising physician. He wants to know which hypnotic is mild in action, which is potent: which rapid in action, which delayed; which has unpleasant after effects; and which is dangerous.

As types of the *mild hypnotic*, we may take amylene hydrate and chloralamide. *Amylene hydrate* is a colourless liquid with a burning, unpleasant taste and a characteristic aromatic odour. It is best administered in capsules or dissolved in alcohol in doses of 30-60 minims. It is a mild hypnotic, is not depressing, is prompt in its action, and after an extensive use, especially in cardiac cases, one has noted no unpleasant after-effects. *Chloral-amide*, a combination of chloral anhydride and formamide, is a bitter crystalline substance, sparingly soluble in water, but which acts well when given dissolved in alcohol, or, better, in an acidulated alcohol, such as spiritus etheris nitrosi. If given undissolved its action is apt to be delayed, and even when dissolved there may be in many cases a considerable latent period. Its advantage is that the formamide in its constitution counteracts the depressing action of the chloral.

As hypnotics of *medium* strength, paraldehyde, sulphonal, and bromural are perhaps the best examples. *Paraldehyde* one regards as one of the most useful and safe hypnotics we possess. Its unpleasant taste is at once an advantage and a disadvantage. Much of the disadvantage may be got over if it be given well diluted as an enema. In favourable cases sleep follows in fifteen minutes. It is a most useful hypnotic in pneumonia in doses of 2 to 4 drachms per rectum. It does not, however, agree where there is a pronounced alcoholic history, its administration then being frequently followed by marked excitement. *Sulphonal* is a substance the use of which should be abandoned. It is slow in its action; it is cumulative; it is toxic, and its toxic dose varies enormously in different individuals. *Bromural* is a sparingly soluble substance which is a fair hypnotic, especially useful in cases of emotional excitement.

Of the more *powerful hypnotics* chloral hydrate, veronal, and trional may be taken as types.

Chloral hydrate has entirely fallen out of fashion. The chemists tell me they seldom dispense it; and like the majority of the halogen-containing hypnotics, it has a depressing effect upon the heart and respiration. The present neglect of chloral hydrate seems scarcely deserved. As an occasional hypnotic, where there is no cardiac weakness, it does well, especially if combined with bromide of potash.

Veronal is at present very popular. Though only sparingly soluble in cold water, it is more freely soluble in warm fluids. It should never be given in solid form or in milk. The minimum dose seems about 3 to 5 grs., but this is often exceeded. If given in large doses (15 grs.), it produces unpleasant after-effects, such as exanthemata accompanied by fever, vertigo, and confusion. It is said not to be cumulative, but of this one has grave doubts. Its prolonged use certainly leads to various nervous phenomena. One has seen both a spastic condition and a form of neuritis, accompanied by loss of knee jerks. Recently veronal has been used with success in the treatment of delirium tremens.

Trional is a useful hypnotic, which gives a reasonably long sleep, but one has often to wait for its action. There is no constancy in the time it will take to act, even in the same individual. The dose should not exceed 25 grs. Hamatoporphyrinuria is rare after its use, but may occur; otherwise there seem to be no dangers attached to its administration. It may with advantage be given along with amylene hydrate or

paraldehyde: the combination gives a rapid and more certain action.

Hypnotics which should be discarded on account of their danger are isopral, chloralose, chloral-urethan, sulphonal, and tetronal. Isopral is damaging to the heart, even in small doses. Chloralose has a convulsive action. Chloral-urethan has a toxic action, more pronounced and prolonged than the hypnotic. Sulphonal and tetronal are dangerous.

In considering the use and possible abuse of the synthetic hypnotics there are certain points which should be kept in view. If *emotional excitement* exists, the best results will probably be got from the use of a preparation such as bromural, into whose constitution bromide enters, or by combining the administration of one of the hypnotics with fairly large doses of a bromide salt. In insomnia from overwork and worry, any of the milder hypnotics will do but one should always *ring the changes*. The same hypnotic should never be continued over a lengthened period: tolerance is set up, and there is grave risk of establishing a drug habit. It is true that tolerance for one member of the group produces to a certain extent tolerance for all, but it is a good rule to *vary* and to *combine different members*, and so, as far as possible, avoid tolerance and habit.

A hypnotic should never be given undissolved. If it is, there is uncertainty in time of action; it may remain unabsorbed for a considerable period, and, acting the following day, may produce considerable discomfort. It is an excellent plan to give a hypnotic dissolved in some form of alcohol. We then get assistance from the hypnotic action of the alcohol.

In the use of hypnotics the patient as a personal factor is of considerable importance. Unfortunately, we never can tell when an individual may be peculiarly susceptible. Universal erythema, with high temperature, may follow a single dose of veronal or chloral hydrate. One has seen a universal erythema with a temperature of 105° follow a single dose of veronal. At times vertigo is a prominent after-effect. An elderly lady under my care was unable to rise from her bed for a week after a dose of 5 grs. of veronal.

The use of the synthetic hypnotics in insomnia resulting from pain might almost be regarded as abuse on the part of the physician. Take, for example, such a substance as chloral hydrate. If pain be marked, large, even dangerous doses, must be exhibited, and even then there is no true sleep. The patient

will remain quiet, but he will tell you in the morning that he has spent a night of misery, partly unconscious and unable to move, but acutely conscious of his pain. Again, it may be termed abuse to treat insomnia with hypnotics alone—to do so is to court disaster. As physicians we should treat not the symptom, but the diseased condition on which it depends.

Abuse of hypnotics on the part of the patient will result in a drug habit. It is quite impossible for a physician from his personal experience to offer any opinion as to the prevalence of such a habit. All have had, no doubt, to deal with individual cases, where a patient has been ordered or has taken hypnotics on his own account, and so established a habit with all its usual train of mental and moral deterioration. The physician can do a little to avoid this if he remembers to mark his prescription "Non Rep." Yet this will not help us much; for while the sale of chloral hydrate and sulphonal is regulated by law, veronal, trional, and the more dangerous hypnotics may be bought freely by the public. Surely this is unsatisfactory.

We do not get much help as regards the possible prevalence of the drug habit from the statistics published by the Registrar-General. We all know how unsatisfactory statistics compiled from death certificates are. For instance, we find in England and Wales in 1907, four deaths from paraldehyde poisoning. But death from paraldehyde poisoning is recognised as almost, if not quite, unknown. From the admissions of voluntary patients to inebriate homes we cannot judge. Dr. Crauford Dunlop tells me that in most of the cases the drug habit is complicated with alcohol habit, and that there is no special preponderance of one hypnotic. Once the habit is established any hypnotic substance will be taken indiscriminately.

The questions which seem most to call for discussion appear to be—Which of the synthetic hypnotics is most useful under different circumstances? Which are dangerous and should be discarded? Is it desirable that further legislative restrictions should be placed on the sale of hypnotics?

The Vice-President (Dr. C. W. MacGillivray) said he felt sure there were many points on which most of the members had received very interesting information. He was surprised that bromural was considered one of the most important hypnotics; from practical experience one might have thought that it was an adjuvant of faith-healing

more than of anything else. With regard to the sale of drugs, that was a difficulty; he himself had had a patient recovering from alcoholic excess who, when out his first drive, bought a bottle containing 25 to 30 tabloids of veronal and consumed the whole of them in one night.

Dr. Clouston said he was very glad indeed that Dr. Boyd had given the Society the opportunity of discussing hypnotics; he thought they had been rather poorly off in the matter of discussions on these important drugs; he could not remember a discussion on one of these drugs perhaps since chloral was discovered. With five minutes at one's disposal one could really only dogmatically state certain things and certain conclusions one had come to; it was quite impossible to really discuss the matter.

Hypnotics must be divided according to whether one wanted a pure sleep effect, a sedative effect, or a muscular quietus. As regards a pure hypnotic, he agreed with Dr. Boyd that paraldehyde was the most useful, most harmless, and by far the most effective. A nurse of his once gave a patient, who had just begun to take paraldehyde, 2 ozs. at a time; it had given him (Dr. Clouston) a fright, but the patient was not much the worse. One had to keep in mind also whether an instantaneous or a gradual effect was required. In almost every case a better effect was produced by combining certain drugs than by giving one alone. A better effect was obtained by giving sulphonal or veronal at nine o'clock and following it up by paraldehyde at ten o'clock; the paraldehyde sent the patient to sleep instantaneously, and he would sleep longer. Smaller doses were required, and the results were more satisfactory when drugs were given in combination.

Dr. Boyd had said nothing about bromide of potassium. They were apt to neglect the bromides as adjuvants to hypnotics and sedatives. There were very few cases in which 20 grs. of bromide added to a sedative, not necessarily a hypnotic, did not enable the patient to have a good sleep; he combined bromide of potassium in considerable doses with sulphonal without bad effects. He absolutely differed with Dr. Boyd in saying that sulphonal was a drug that was always to be avoided. If Dr. Boyd had had his (Dr. Clouston's) experience of keeping old people with restlessness and troublesome noises out of an asylum by means of 10 grs. of sulphonal and 20 grs. of bromide of potassium, he would not have made that statement.

With regard to veronal, most of them were working it up; there were bad effects—partial paralysis, giddiness, and so on—from it, but there was no doubt that veronal was an admirable drug, but they did not know in which particular cases it did good. Then the practitioner gave this drug in 3 to 5-gr. doses, they in the asylum practice dealt in drachm doses; he would no more think of prescribing for a melancholic patient 3 grs. of veronal than he would think of prescribing

water; he would never think of giving less than 10 grs. in an agitated case. His experience was that a combination of veronal and trional, 5 or 7 grs. of each, was very satisfactory. He again emphasised the great importance of combining these drugs, necessitating smaller doses and thus avoiding bad effects.

He emphasised the necessity of making up one's mind as to whether a sedative or hypnotic effect was desired; if hypnotic, give either paraldehyde or veronal; if sedative, give potassium bromide along with sulphonal or trional. There was always a danger of hæmaturia resulting from sulphonal or trional, but when given in hot milk this danger was lessened.

Dr. Boyd's denunciation of tabloids had surprised him; he (Dr. Boyd) might be right, but tabloids were so exceedingly convenient that he was afraid most of them were guilty of using them; but he thought Dr. Boyd had given a valuable hint in saying that tabloids were to be avoided in some cases.

He concluded by saying that he thought this ought to be a valuable discussion, and ought to have taken place in the Society long ago.

Dr. G. M. Robertson, in the first place, wished to say with Dr. Clouston how exceedingly pleased he was with the paper Dr. Boyd had presented them with. Not only was it interesting, but he found himself in agreement with almost everything Dr. Boyd had said; he hardly expected that, for of course the experience of one dealing with acute mental disease must be very different from that of those dealing with the earlier cases of nervous disturbance. Like Dr. Clouston, he was surprised that Dr. Boyd had not said more about the use of paraldehyde; he also agreed with Dr. Clouston that giving hypnotic drugs in combination was exceedingly valuable. He thought the most valuable combination was where one drug whose action was prolonged was given in association with a drug whose action was speedy. The most perfect combination is paraldehyde and bromide of potassium. If bromide of potassium is given in respectable doses—it was usually given in too small doses—such as one drachm or even more, and given at seven or eight o'clock, so that about ten o'clock its action is beginning to take place, and if paraldehyde is given when the patient is actually in bed, the action is immediate—he had known patients go to sleep a couple of minutes after paraldehyde—and the patient is kept in a sleepy condition for two or three hours afterwards by means of the bromide of potassium. That was especially useful in the lesser cases of insomnia. Dr. Clouston's nurse had given 2 ozs. of paraldehyde to a patient; one of his (Dr. Robertson's) dispensers had dispensed 2 ozs. of paraldehyde to about half a dozen patients. The condition of these patients had alarmed him very greatly; they looked as if they were under the influence of chloroform; one could have

operated on them and they would never have moved. One of these cases died, but the patient was suffering from advanced phthisis and heart disease, and no doubt that contributed to the death.

As regards sulphonal, about ten or fifteen years ago there never was a meeting of the Medico-Psychological Society that did not resolve itself into a society for the praise of sulphonal; it was regarded as the drug they had been looking for for years, but afterwards they found it had had effects and that hæmatoporphyria was apt to result. He quite agreed with Dr. Boyd, and he had given up the use of sulphonal altogether. During the nine years he was at Larbert he had never given it but with one exception on the female side. There were twenty times more deaths in women than in men from sulphonal. On the male side, he only employed it in general paralysis of the insane. They did not very often see deaths recorded from sulphonal. He would like to ask those who used it now whether the drug is as dangerous as it used to be, or whether it was more impure before? If he could satisfy himself that it was harmless he would be very pleased to use it; he had seen death occurring after the third dose.

With regard to veronal, he also agreed with Dr. Boyd that it had very bad after-effects in some cases.

Bromural is a very nice hypnotic in certain cases, not very strong.

Trional has been recorded in Germany as having a most powerful degenerative effect on nerve cells; he thought one must be chary in using a drug which had this degenerative effect.

Dr. Affleck said that, after all, the discussion must be very much a narration of one's own experience; one could not lay down hard-and-fast rules with regard to the administration of these substances. Hypnotics were undoubtedly more used now than perhaps they had ever been, and they all knew they were good for various purposes. The importance of procuring sleep under various conditions, physical and mental, was universally recognised; they had many adjuvants which were common, and they used these according to the condition they had to deal with—whether sleeplessness from pain, mental disturbance, or any other cause. Sometimes they met with cases where the sleeplessness was the most recognisable symptom, where the patient complained of inability to sleep, and in these days of stress and strain perhaps the want of sleep was less well borne than it used to be; people were less content to do without a night's rest, and were more disquieted by it than they used to be. They must endeavour to remember, however, that where there was sleeplessness one had to try and search out the cause, because not unfrequently it was found that by treating some of the organs which might be disturbed, such as the digestive organs, by giving a dose of calomel, and sometimes by a change to the country, sleep could be brought about without any drug at all.

In his experience in dealing with insomnia, due to overstrain of the brain, the safer drugs were the best. He found a combination of bromide of potassium or sodium with tincture of hop very successful as a sedative; he had found this combination in cases of simple insomnia of short duration and unaccompanied by mental symptoms more successful than any other. Every case must necessarily be a law unto itself. One could not classify drugs from their chemical substance or physiological or clinical characters. The personal element had always to be dealt with; what suited one case absolutely failed in another, and it was very disconcerting to find that a hypnotic or sedative did well with a patient at one time and failed at another.

As regards drugs, he agreed with the other speakers as to the value of paraldehyde; he had used it a great deal; it was attended with fewer disadvantages and dangers than any of the stronger hypnotics. He had seen the habit developed, and there was not much difficulty in diagnosing it; one could smell it yards off.

Chloral he had found of very great service indeed in the delirium of acute disease and fever. He could recall a case of typhoid fever with coma-vigil—a very grave symptom—which was overcome by chloral and bromide; the patient went into a good sleep and made a good recovery. It was also of service in the delirium of pneumonia.

With regard to sulphonal, he thought Dr. Boyd was a little too sweeping in his denunciation; he had not found any bad effects from it nor from trional, but he certainly had seen some very disquieting symptoms from veronal. He thought practitioners should exert more care than they at present did. Knowing they were using strong remedies, they should watch their effects with very great vigilance indeed.

Dr. Sillar said he had not come to speak but in the capacity of one anxious to learn about these hypnotics. The usefulness of these drugs could be spoken of better by the clinical observer than by the purely pharmacological observer. The fact which Dr. Clouston had brought forward as regards combination was an extremely important one, because it was in connection with the prescribing of hypnotics that the question of combination had most largely fallen into disuse. Very few doctors would prescribe one single purgative which would act on one particular part of the intestine; nearly everyone would combine various purgatives in order to get a better result. If their knowledge of the way in which different hypnotics affected individual parts of the nervous system were more profound, then the various hypnotics would be used with greater certainty than they were at present. Then another point: it seemed to him that in prescribing hypnotics the average practitioner is extremely impatient; there is nothing that is expected to act with such rapidity as a hypnotic. It is not only a question of solubility (that was an extremely important point, of course,

because obviously the more insoluble the substance is the more difficult it will be to dissolve, and therefore the more difficult to map out the accurate dosage) but of absorbability. For example, one knows how rapidly alcohol passes through the tissues and produces the effects which are expected and looked for; therefore one would have liked to have heard Dr. Boyd begin the discussion by discussing alcoholic hypnotics, because they were amongst the most interesting and important. He was extremely interested and delighted to hear Dr. Affleck mention the tincture of hop; he himself had prescribed alcohol, not in the form of the tincture of hop but in the form of a glass of beer or stout. In sleepless irritation one of the most useful substances is the spirit of ether—a strong solution, with the addition of a little nitrite; this does good, no doubt, because it dilates the peripheral circulation. If hypnotic substances and diaphoretic substances, in small doses, were prescribed in combination, better results would be obtained than if large doses of one individual substance were depended on. It was, therefore, of very great importance to keep in view the solubility of these various hypnotics. It was well to give these substances in alcohol, not only for the purpose of dilating the peripheral circulation, but because of the very much more rapid absorbability of all substances dissolved in alcohol than of substances dissolved in water. It is interesting to observe in this connection the extraordinary consensus of opinion with regard to the great value of paraldehyde; paraldehyde, of all the substances mentioned, was the most like alcohol, therefore one would expect to find that paraldehyde was one of the most useful hypnotics.

Dr. James Ritchie said that in every case where a hypnotic was required it was essential to consider the reason for it. If it was required on account of pain, there was nothing like an opiate; if for excitement of the nervous system from prolonged work, there was nothing equal to a nerve sedative, such as bromide, in a fairly good dose; but if, in addition, there is a certain amount of exhaustion, it is necessary to prescribe some stimulant. For old people, a stimulant in the form of soup on waking at night was very beneficial. If there is a reflex cause that must be treated, as Dr. Boyd had pointed out. In young people a small dose of Mindererus spirit is very useful; this had been mentioned to him by Dr. Alexander Bruce some time ago, and he (Dr. Ritchie) had since used it with distinct advantage. The one advantage that paraldehyde has over alcohol is that patients are not likely to form a habit. He had had experience of alcohol being used by patients, and it was a very useful drug for a particular purpose, but if it had to be continued, it was necessary to take larger and larger doses, and the drug habit was very easily acquired; then after a time, instead of a hypnotic effect, the reverse was obtained—all of them had had experience of people who, after taking very large doses

of alcohol, became wakeful. He thought Dr. Boyd was right in taking exception to tabloids; they were very useful, but they lent themselves to the drug habit; further, if one wanted to get the full effect of the drug, it was better to be dissolved; if given in tabloids it was a very long time of going into action. For many years he had hardly used sulphonal at all. He had used it in a case of paralysis agitans, and the following day there was such an amount of ataxia that he concluded the drug had a lowering effect on the nervous system; the cumulative effect and the effect on the blood had also to be taken into account.

Trional he had practically never used, and he was glad to hear from Dr. Robertson that he had escaped doing some damage to his patients' nervous systems on that account.

Veronal he used perhaps as often as any other drug, but he did not give it in 3 to 5 but in 7 to 10-gr. doses, and in hot water or spirits and water.

Chloral in not a few cases was useful. As Dr. Clouston had pointed out, one often got advantages by giving a bromide in combination. Paraldehyde had one advantage, namely, that the patient never acquired a taste for it, at all events he had not found anyone who had done so.

Dr. Lundie said one sometimes found a patient extremely tired, weary, apparently too tired to sleep; no doubt most of the substances which had been mentioned would produce the effect desired, but a very ready, simple and safe remedy, always to hand, and which often did remarkably well in these cases, was a cup of tea. Then there was one substance he thought extremely useful in those cases where the patient's leading symptom is sleeplessness, apparently induced by worry, strain, overwork, and so on, namely, phosphorus, which he regarded as a distinctly curative hypnotic when given steadily and constantly.

Dr. Hunter said Dr. Boyd had laid great stress on the most important point, namely, What was the cause? The treatment of restlessness due to high tension, to digestive disorder, and to various things like that is totally different in different cases, and the success will be to the man who diagnoses the cause of the restlessness rather than to the nature of the hypnotic which he uses. The first thing is, if possible, to find out the cause. In addition to the calomel, which had been mentioned by Dr. Affleck, the sweet spirit of nitre with a little bromide is excellent. His second point was to lay stress on the dangers of the long-continued use of veronal. He (Dr. Hunter) had seen two or three cases where patients had tumbled down as if they had had a shock, and, in fact, the attendants had called the doctor in a hurry because they supposed it to be a shock; it was really a paralysis of motor power; in addition, sometimes there were curious ocular delusions. He was not inclined to take the view Dr. Clouston did;

he thought 10 grs. rather a big dose for patients who are not maniacal. No speaker had said anything about the sale of these hypnotics, and the ease with which they can be got hold of without any restriction.

Dr. Boyd, in reply, said he quite agreed with what Dr. Clouston said about bromides, but he did not think he was justified in including bromides in his introduction to the discussion, which dealt with the synthetic hypnotics.

As regards sulphonal, he (Dr. Boyd) had not said that sulphonal was to be avoided; he said it was to be discarded altogether. They had no right to use a dangerous hypnotic like sulphonal if they could get the same effect from less dangerous drugs.

Then exception was taken as regards the dosage of veronal. He had referred to the minimum dose of 5 grs., but one could go up to 20 grs. He agreed about the combining of drugs and had referred to that in his remarks. As regards deaths from sulphonal, there were only six or eight deaths in England and Wales recorded. Trional he thought much less dangerous than sulphonal. Dr. Sillar spoke of alcohol, and he (Dr. Boyd) quite agreed with him that it is a most useful drug; he also agreed with Dr. Lundie about the cup of tea, but he did not think either alcohol or tea came within the scope of this discussion. Phosphorus as a hypnotic he had had no experience of. He concluded by thanking the Society for the way in which they had received his paper.

EARLY KNOWLEDGE REGARDING PHTHISIS.

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IN view of the forthcoming Conference in Edinburgh on consumption and other forms of tuberculosis it has seemed to the writer that a short sketch of the earlier development in knowledge and in opinions held regarding this disease might prove generally interesting. The following short article consists, therefore, of some historical notes prepared in connection with an historical and literary section which, at the request of the Executive Committee, the writer has got together for the exhibition connected with the Conference. For several of the references to works that he has quoted he desires to express his thanks to Professor W. Osler and to Dr. James Miller.

NOMENCLATURE OF THE DISEASE.

While instances of the disease known at the present day as "Tuberculosis" can be recognised from their symptoms in the writings of the ancient dwellers in Egypt and Assyria, our first definite knowledge may be said to date from the time of Hippocrates (460-355 B.C.), who gave to wasting disease affecting the lungs, accompanied by cough, spit, and fever, the name of "Phthisis."¹ A few of his aphorisms will serve to show that the disease to which he gave this name was essentially the same as that of which we still think when we use the term at the present day:—

"Those who spit up frothy blood bring this up from the lung."

"Phthisis arises chiefly at ages from eighteen to thirty-five years."

"In one affected by phthisis, the appearance of diarrhoea is a deadly sign."

"When an empyema develops in patients from pleurisy, if they get clear of it in forty days after it bursts it is checked; if not, they develop phthisis."

"Autumn is bad for the phthysical."

Without going into the debated question of how far in the age of Socrates and Pericles physicians pursued the study of morbid anatomy, one may say that Hippocrates, who lived in

this brilliant age of Greece, was well acquainted, not only with the outward appearances and the future prospects of patients suffering from this disease, but that he understood in a general way the changes in the lungs that accompany its symptoms. Hippocrates, however, does not apparently recognise the infectious nature of phthisis, though in the first book of the *Epidemics* he gives an elaborate description of an acute form of the disease. The subsequent Greek and Roman writers continue the name in the same sense, though the term consumption is quite a modern variation of this word. "Tabes," another Greek term for wasting, was used in a more general sense.

The term "struma" was applied by Celsus,² who flourished at the beginning of the Christian era, to the enlarged glands in the neck; while the term "scrofula" (*scrofa*, a pig) was given by the later Roman writers, *e.g.* Vegetius, to the great enlargement of these glands, which sometimes confers upon the face and neck a distinctly pig-like expression. These words have remained in constant use till, in the last century, the identity of cause was established both in the case of enlarged glands and in that of pulmonary phthisis when the two words naturally fell into disuse.

The word "tubercle" was apparently first applied to the little nodules occurring in a diseased lung by Sylvius³ about the year 1680. This Sylvius is not to be confounded with Jacobus Sylvius, the teacher of Vesalius and friend of Ambroise Paré, whose name we associate with the fissure in the brain which he described, but is the Leyden teacher, Franciscus Sylvius, who was one of the first to originate in the famous Dutch University that system of clinical teaching introduced at its commencement into the Edinburgh Medical School, and continuing one of its chief features to the present day.

The term "tuberculosis," indicating the general disease produced by the formation of these tubercles, seems not to have been introduced until about the year 1843, when Canstatt⁴ advances it in his *Text-Book of Pathology*.

NATURE OF THE DISEASE.

The peculiar characters of the disease were, as we have already stated, well understood at the time of Hippocrates. Celsus (*circa* 50 A.D.) divides "tabes" into three types. One of these he calls "atrophy," a condition in which the body is not nourished and

becomes emaciated; a second type he calls "cachexia," where the habit of the body is bad and all the nutriment becomes corrupted. "The third, and by far the most dangerous species, is that to which the Greeks give the name of phthisis. It generally takes its rise from the head and thence descends upon the lungs. From this an ulceration proceeds, and there comes a slow fever which although it may have abated yet returns. In this also there is a frequent cough, and pus is expectorated and sometimes something bloody. Whatever comes up, if it be thrown upon the fire, has a bad smell. Therefore those that are doubtful of the disease try it by this test."

With regard to the theory of origin, it may be remarked that the catarrh in which the disease was supposed to be produced originated from the brain, passed down into the nose, and thence as the cold moist humour dropped into the warm lung it produced an ulceration—a crude but by no means an extravagant theory.

Galen's theory regarding the cause of phthisis is simply to regard it as a process of ulceration arising from extravasated blood within the lung or between this organ and the chest.⁵

Among the compilers of the Byzantine Empire there is nothing additional to note, and it seems not to have occurred seriously to any of the ancient writers that this disease was of an infectious nature. To the Arabs the learning of the Ancient World passed over during the Dark Ages when throughout Europe men and races were too busy with the desperate struggle for bare existence to pay any attention to the cultivation of the gentler sciences, and among the Arab writers, for example Rhazes, Avicenna, and Haly Abbas, the infectious nature of various diseases was first distinctly stated. Haly Abbas⁶ gives as examples of infectious maladies—leprosy, scabies, phthisis, madness, smallpox, and ophthalmia, and recommends for prophylactic measures that one should not stay long with the sick nor dwell in the same house with them, and that one should use various cleansings and fumigations.

The progress of knowledge regarding the real nature of the disease may be divided into four stages as follows:—

First Stage.—Throughout the Middle Ages the idea of an abscess in the lungs or elsewhere was that it originated simply from the stagnation and putrefaction of a humour in a place to which it should not have come, and the modern idea regarding the specific nature of tuberculosis begins with Sylvius, who first described in 1680 the special structures that we know as tubercles. "I had no doubt," he says, "that in these tubercles lies the hereditary and fatal

predisposition to phthisis of certain families, for the tubercles are wont to increase with age and gradually proceed to suppuration. . . . I have come at length to several suspicions about the glands, which are naturally extremely small and almost invisible to the eye, except when they increase somewhat in size and show themselves to the vision scattered everywhere throughout the organs and flesh of our bodies. To these thoughts and conjectures of mine the little glands in the choroid plexus have given rise, which are not visible save in an unnatural state, though then they may reach sometimes to a considerable size, also the glands or glandulous tubercles now in the lung and the glands manifest through various parts of the body in the strumous or scrofulous constitution."

Sylvius thus does little more than suggest an analogy between scrofula and phthisis, while Richard Wiseman,⁷ surgeon to King Charles II., defines scrofula, which apparently he does not recognise to be connected in any way with phthisis, as "a tumour arising from a peculiar acidity of the serum of the blood, which, whensoever it lies upon glandulae, muscle, or membrane, it coagulates and hardens, when it mixeth with marrow always dissolves it and rotteth the bone."

An important advance was made by Richard Morton in his *Exercitationes de Phthisi*, published at London in 1689, in which he for the first time recognised the identity of scrofula and tubercle. He was also one of the first English authors who insisted upon the contagiousness of the disease, and he regarded the presence of enlarged glands upon the surface of the body as a help in diagnosing the internal disease of phthisis.

In 1700 the next step in arriving at our modern knowledge was made by Manget,⁸ who, in the additions made by him to the *Sepulchretum* of Bonetus, described the celebrated autopsy upon the body of a young man, aged 17, who had died of phthisis. He found tubercles, which he compares in size to millet seeds, scattered throughout not only the lungs but the liver, spleen, mesenteric glands and intestine, thus describing the first case recorded of *miliary tuberculosis*.

Boerhaave,⁹ the most celebrated physician and teacher of the eighteenth century, was content in his aphorisms to trace phthisis back to an ulcer of the lungs, which he supposed to originate from a stoppage of the blood, and its change into purulent matter, thus following the mediæval view.

Morgagni,¹⁰ the founder of morbid anatomy as a science, in his great book on *The Seats and Causes of Disease*, raises the question

whether tubercles are really glands, and expresses an adverse opinion, though he offers no solution of the problem as to their real nature.

An important step in discovering the nature of the tubercle was made by William Stark,¹¹ whose works were published in 1788. He not only attributes pulmonary phthisis in every case to tubercles, but he performed some early researches upon the structure of these little bodies, showing by a process of injection that they contain no blood-vessels. His work was further promulgated and enlarged by Thomas Reid, who is mentioned a little further on as the originator of the curious method of treatment by means of vomits. The great step of deciding that tubercles were not glands, as had been supposed for a century since the time of Sylvius, was made by Matthew Baillie¹² in his *Morbid Anatomy*, published at London in 1797. Baillie was a Scotsman, born at Shotts in 1761, his mother being a sister of the celebrated anatomists, John and William Hunter. In his *Morbid Anatomy*, which contains the earliest pictorial representations of this disease, he describes scrofulous tumours not only in glands but in the pericardium, pharynx, peritoneum and mesentery, tubercles in the liver and spleen, abscesses and tubercles in the kidney, scrofulous vesiculæ seminales, scrofulous ulcer of the bladder, scrofulous testicle, and scrofulous tumours of the cerebral membranes. He declares that the tubercles are not glands, as some imagine, but a special formation in the cellular tissue between the air cells of the lungs, which later burst into the air cells and suppurate. He further appears to have been one of the first to apply the term "cheesy" to the matter in the glands. Along with Baillie should be mentioned Pott,¹³ who was the first to describe scrofula as it affects the bones in his classical monograph on *Palsy of the Lower Limbs, which is Frequently Found to Accompany Curvature of the Spine*; also Sir Astley Cooper, who for the first time clearly described tubercle of the testicle in 1830, and Addison,¹⁴ who, in 1855, first recorded the symptoms produced when this disease attacks the suprarenal glands.

The second stage includes the establishment of the fact that tubercles are a special product of disease, and are not enlargements of minute glands; till this became accepted, the idea of the hereditary and unavoidable nature of the disease perforce retained its hold. One of the greatest works on tuberculosis, indeed the first really modern study of the disease, was issued by Bayle,¹⁵ a confrère of Laënnec, in 1810. He describes very accurately the

stages of development of the tubercle, and takes the miliary tubercle as the starting-point in every case. Entirely discarding the theory that the tubercle has anything to do with glands or inflammation of the lymphatic system, he regards the cheesy substance in the tubercle as a specific substance characteristic of this disease, and wherever the cheesy material is found he pronounces the process to be tuberculous. He describes several varieties of the tubercle as encysted or not encysted, formed of homogeneous whitish substance, or yellowish in colour, and varying in size from that of a millet seed to a chestnut. He also describes six varieties of phthisis:—Phthisis tuberculeuse, P. granuleuse, P. avec mélanose, P. ulcéreuse, P. calculeuse, P. cancéreuse.

After the time of Bayle and Laënnec several opponents arose. Broussais,¹⁶ during the life of Laënnec, had acrimoniously disputed with him the relation of tubercles to phthisis, and the fact of whether tubercles are of lymphatic origin, holding that "a sanguine inflammation of the lung either pneumonic or catarrhal can, when it is prolonged by the causes which have produced it, impress on the lymphatic bundles of the organ an impulse which makes them degenerate into tubercles, or which forms a dépôt for tuberculous material." Andral,¹⁷ in 1826, further combated Laënnec's view by insisting that tubercles are formed after inflammation and œdema of the lungs by the deposit of minute particles from the inflammatory fluid, which later fuse together into single tubercles.

On the other side of the dispute, Buhl,¹⁸ in 1857, held that miliary tuberculosis appears always as a specific disease by absorption and infection, and further, that an infectious disease appearing in any individual who already suffered with tubercle and cavities of the lungs, is found to be a miliary tuberculosis. He thus established the idea that the virus was situated in the little cheesy nodules, which, if absorbed and disseminated throughout the body, form other minute nodules containing the peculiar poison.

The third stage included the firm establishment of the fact that the tubercle is of an infectious nature, and may be conveyed from body to body. A great and distinctive step was taken by Villemin,¹⁹ a French army surgeon, who, in 1865, was the first to demonstrate the fact which had for long been popularly suspected, to wit, the transmissibility of tuberculosis. His method was to inoculate rabbits with diseased material obtained from phthisical human beings, and by this means he succeeded in

making them tuberculous. He obtained similar results by injection of the rabbits with tuberculous material from disease in oxen. It was observed that a tuberculous process was set up at the seat of inoculation, and that later on, after, sometimes, a lengthy period of incubation, the tuberculosis spread throughout the body. He therefore concluded that some material, capable of reproducing itself first at the point inoculated and subsequently through the body, was passed into the animal. In 1868 a somewhat parallel experiment was carried out by Chauveau, who showed that heifers might be rendered tuberculous both by inoculation and by feeding with material from cases of abdominal tuberculosis in the ox. These experiments met with repeated contradiction, but they were placed beyond all doubt in 1877 by Cohnheim and Salamonsen, who performed an experiment similar to, but very much more delicate than, that of Villemin, by introducing into the anterior chamber of a rabbit's eye a minute fragment of tuberculous material in a fresh condition. The immediate effects of the slight prick speedily passed away, but the minute fragment remained visible in the anterior chamber of the eye until it was absorbed. After a lapse of some days granulations appeared on the iris, the aqueous humour became cloudy, and upon examination the eye was found to be infected with indubitable tubercles, which could be actually seen.

The fourth stage includes the careful study of the tubercle by microscopic means to find the actual cause of the infection, which was discovered in 1882 by Koch ²¹ to be the bacillus that now bears his name. The account he gives might form a model for scientific records by reason of its clearness, conciseness, and convincingness. The manner in which the discovery was ultimately made consisted in over-staining films and sections of diseased material from sputum, glands, &c., by means of an alkaline solution of methylene blue. Next the films were put in a concentrated solution of vesuvin for one or two minutes and afterwards washed in distilled water. By this means the tubercle bacilli were stained blue, and this colour distinguished them from all other bacteria, tissues, &c., which took on the brown colour of the vesuvin. Subsequently Koch was able to grow the bacteria which he thus discovered upon solidified blood-serum and other media.

The search for the infective agent in the disease caused the study of the tubercle, from a histological point of view, to occupy many of the most prominent minds in the latter half of the nineteenth century. Chief among these was Rokitansky ²² (1855), who

was the first to discover the giant cell characteristic of the tubercle, and to figure it in the third edition of his *Text-Book on Pathological Anatomy*. Certain cells had previously, in 1849, been described by Lebert²³ as corpuscles or globules proper to the tubercle, but were easily shown by Virchow²⁴ to be simply degenerated cells. It has been a gradual work of many years carried on by many observers, chief among whom may be mentioned Virchow himself, Weigert, Baumgarten, and Metchnikoff, to show that the lymphocytes, the endothelial cells, and the giant cells are but stages in the formation of a structure which, it has been suggested, is designed to destroy and shut off tubercle bacilli from the remainder of the body.

The question as to the non-identity of human and bovine tuberculosis was raised in 1901 and 1902 by Koch,²⁵ who pled that all experiments on the point had been performed by inoculation from man to animals, and pointed out the great need for fuller investigation; and the Royal Commission is still engaged in the difficult study of the conditions that govern the relations between these two types of the disease.

DIAGNOSIS.

Hippocrates, as already mentioned, refers in several of his works to incidental points in the nature and diagnosis of phthisis. A point of special importance is, that "if the sputum of a patient when poured upon hot coal has a heavy smell, the person is suffering from phthisis," and he appears to have practised a rough form of auscultation by applying his ear to the patient's side. Aretaeus,²⁶ a writer about the end of the first century A.D., gives a description of the type of person liable to suffer from phthisis, which has been famous ever since:—"The old seldom suffer from this disease, but very rarely recover from it: the young until manhood become phthisical from spitting of blood and do recover indeed, but not readily; children continue to cough even until the cough pass into phthoe, and yet readily recover. The forms of body most prone to the disease are slender, those in which the scapulae protrude like folded doors or like wings, in those who have prominent throats, and those who are pale and have narrow chests. As to constitutions, those which are cold and humid as being akin to the nature of the disease."

All through the Middle Ages the diagnosis had to depend upon the outward appearance of the patient and his symptoms.

Sylvius, writing in the year 1680, gives the signs of early phthisis and those of a desperate and incurable case. In the former we have (1) cough coming on after a pneumonia or pleurisy or empyema, lasting a long time, with expectoration of pus; (2) slow continuous fever; (3) wasting of the body, with loss of appetite and prostration of strength. The desperate case he recognises by the symptoms of (1) general emaciation, pallor, and feebleness; (2) troublesome cough, with expectoration of pus and embarrassment of breathing; (3) slow hectic fever.

Not until the year 1761 was any new method devised by which more certain assurance could be obtained as to the unnatural condition of the chest. In this year Auenbrugger²⁷ published his "new discovery" in the form of a short pamphlet, wherein he described the sounds which are given out when the chest is struck with the fingers. For the purposes of this percussion, the points of the fingers were all brought together and the chest of the patient percussed here and there to determine the resonance of the note. Sometimes the percussor wore a glove, sometimes he performed his examination with the fingers bare. Auenbrugger describes, quite in our modern manner, the physical signs which can be elicited by percussion, and he verified his results by examining the chests of those who died.

It was not till more than half a century afterwards that auscultation was described by Laënnec,²⁸ while physician to the Necker Hospital in Paris. His work, *Traité de l'Auscultation Médiate*, appeared in 1819, and includes both a large amount of pathological research on the nature of diseases of the chest, together with the physical signs which he founded upon the morbid anatomical work of Bayle and of himself. His account of the physical signs, as revealed by auscultation, presents us with an almost perfect work in clinical medicine, and while they have been reclassified and rearranged, we use them at the present day in practically the same form as that in which they were originally recorded by their discoverer. As examples of the signs which he discovered and whose significance he elucidated by anatomical examination, we may mention the "cracked pot" sound, which he attributed to an excavation close to the surface of the lung; pectoriloquy, which he held to be equivalent to the formation of a ragged cavity; and the crepitant moist râle, which he considered pathognomonic of pneumonia in its earliest stage. His discovery of the stethoscope may be given in a translation of his own words: "In 1816 I was consulted by

a young woman labouring under general symptoms of diseased heart, and in whose case percussion and the application of the hand were of little avail on account of the great degree of fatness, the other method just mentioned being rendered inadmissible by the age and sex of the patient. I happened to recollect a simple and well-known fact in acoustics, and fancied it might be turned to some use on the present occasion. The fact to which I allude is the great distinctness with which we hear the scratch of a pin at one end of a piece of wood on applying our ear to the other. Immediately on this suggestion I rolled a quire of paper into a kind of cylinder and applied one end of it to the region of the heart and the other to my ear, and was not a little surprised and pleased to find that I could thereby perceive the action of the heart in a manner much more clear and distinct than I had ever been able to do by the immediate application of the ear. . . . The first instrument which I used was a cylinder of paper formed of three quires compactly rolled together and kept in shape by paste. The longitudinal aperture which is always left in the centre of a paper thus rolled led incidentally in my hands to an important discovery. This aperture is essential to the exploration of the voice; a cylinder without any aperture is best for the exploration of the heart. The same kind of instrument will indeed suffice for the respiration and rhonchus, but both these are more distinctly perceived by means of a cylinder which is perforated throughout and excavated into somewhat of a funnel shape at one of its extremities to the depth of an inch and a half. . . . This instrument I have named the *stethoscope*." It is a fact of pathetic interest that Laënnec shared the same fate as Corvisart, Lancisi, and Bayle, dying of phthisis in 1826 just after a second edition of his immortal work had passed the press.

Piorry,²⁰ in 1828, published his *Treatise on Mediate Percussion*, in which he suggested a modification of the Laënnec stethoscope into the form of the thin tube with expanded end which we know to-day. Piorry also devised the plessimeter, a thin oval ivory plate with up-turned ends, upon which the percussor struck with one or two fingers, instead of by Auenbrugger's original method. This was supposed to be less uncomfortable to the patient and more valuable in the results it gave to the examiner, and in Piorry's *Atlas de Plessimétrie* a careful and elaborate account is given of the information to be thus elicited.

Since Skoda²¹ published his treatise giving a rearrangement of these authors' works, with commentaries of his own, at Vienna

before the middle of the nineteenth century, there has been practically no new fact added to this important branch in physical examination of the lungs.

An impulse was given in the direction of exact observation upon the chest by Louis's *Recherches sur la Phthisie* in 1825.³¹ In this treatise he introduced his so-called "numerical method." Medical observation hitherto had dealt with the record by men in authority of certain facts relating to each disease. These facts were either accepted as true or declined as false; but Louis has the merit of introducing the idea that symptoms, signs, &c., may be of relative importance or truth in proportion to the frequency of their occurrence. Accordingly we find that his work is specially distinguished by its statistical inquiries, and that all his notes, measurements, &c., are made with the most scrupulous exactitude.

The physical examination of the chest having reached so great a state of perfection, it only remained to discover something which might distinguish the disease from all other similar conditions of the chest. This was effected when Koch in 1882 published his description of the tubercle bacillus. It is unnecessary to do more than mention the valuable diagnostic method introduced in the form of tuberculin by the same authority, and later modified in various ways by other workers.

TREATMENT.

In the classical period of Ancient Greece, when rationalism and simplicity were the distinguishing characteristics alike of medical theory and of medical treatment, a favourite method of healing various diseases consisted in the rest and exposure to the sunshine and fresh air which was to be obtained by a residence at one of the health temples of Asklepios. Of these shrines, some 200 were to be found scattered throughout Greece at different periods, the largest being situate at Epidaurus. Here the phthysical patient, like the rest, was able to perform his oblations to the God of Healing, to recline in marble shelters by which he was protected from the wind, to sleep by night in the fresh air, and to occupy his mind throughout the day by means of plays and spectacles performed in the magnificent open-air theatre and stadium which formed prominent features of the health resort outside the temple precincts.

When we come to the period at which Rome was mistress

of the world, we find the great Augustan medical writer, Celsus, possessed of what appears to be a sound appreciation of the lines on which treatment should be conducted in order to alleviate a case of phthisis.³² He recognised as of great importance a change of air, particularly by a long sea voyage like that to Alexandria, or if the patient was too weak for this, by shorter voyages, or by carriage in a litter. He also lays particular stress upon a proper dietary, recommending milk, gruel, rice, brains, fish, flour mixed with mutton suet or goat's suet, and light wine. As medicine, he prescribes plaitain juice or turpentine mixed with butter and honey. Regarding glands in the neck or strumæ, which, however, he entirely fails to connect with phthisis, he is thoroughly alive to their liability to recur after treatment, and he favours the idea that they should be handled by surgical operation.

Pliny,³³ a slightly later writer (23-79 A.D.), who goes on the principle of including in his cyclopedic work everything which had been mentioned by any authority as a remedy, has nothing to add to this beyond stating that some in his time had found goat's suet an advantageous article of diet, and that others recommended the inhalation through a reed of the smoke from dried cow-dung—a sufficiently disgusting remedy upon which some mediæval methods apparently have been based.

Galen³⁴ (131-200 A.D.), the greatest medical writer of antiquity, recommended milk as a diet of particular importance so long as it suited the digestion of the patient. He lays great stress upon the point that milk should be warm, and for this purpose he says that the ass, whose milk he specially commends, should be brought to the dwelling of the consumptive patient. Human milk he also regards as a valuable remedy, and he mentions that the digestion of any form of milk is increased by mixing it with a little honey. He also recommends change to a dry climate such as that of Upper Egypt or of Libya, but, like most of the early writers, he considers that the cure is in all cases difficult or impossible.

It is interesting to note that in the earliest medical work of any Germanic people, a leech-book, prepared in Wessex about the time of King Alfred, for a physician who rejoiced in the name of Bald, chronic lung disease is mentioned several times. For its treatment, the inunction of oil is specially recommended, together with various herbal remedies which formed the chief resource of the old English leeches. After directing that the man should be smeared with oil, and that the sides and ribs should be warmed with a little new wool, the leech goes on to say that blood should

be let from the sound elbow, but adds, "If thou lettest him too much blood, there will be no hope of his life." The medicine was prescribed as follows:—"Work him a brewit from roots of wallwort and from fleathwort and hoarhound and dill seed. Seethe these in butter. Give him this brewit to eat cold in the morning, and at night dress his meat with oil, and let all his drink be cold." Like Galen, he indicates his despair of any advantage to be derived from even the best of treatment by adding, "In many a man the lung decayeth."³⁵

In the Middle Ages a curious superstition arose, and has lasted almost to our own times, regarding the cure of consumption and its allied diseases. While in the time of St. Gregory of Tours (600 A.D.) the power of the Church to confer recovery from curable diseases was openly claimed equally with the right to remit sins, the position as regards the former was gradually given up. Nevertheless kings, as an adjunct of their divine prerogative, were for a much longer time supposed to possess a peculiar healing virtue by the laying on of hands. Clovis, the first Christian king of the Franks (465-511 A.D.), and Edward the Confessor in England (1002-1066 A.D.) both attempted the cure of every kind of disease; but at a later time the royal power to heal was confined to "touching" persons afflicted with strumous glands and sores. These accordingly received the popular name of "King's Evil," a term which, in the seventeenth century, became the recognised expression employed by medical writers to designate this disease. The privilege was exercised by various kings of France and England, but by none so much as Charles II., under whom the physicians and clergy combined to encourage the king in its practice. It is noteworthy that although Charles I. had assiduously exercised this supposed divine prerogative, so shrewd a man as Sir Thomas Browne, the Norwich physician, who exposes many popular superstitions of his time in his *Vulgar and Common Errors*, either did not care, or did not dare, to attack a practice which so obviously lent itself to sarcastic commentary. His namesake, John Browne,³⁶ Chirurgeon to His Majesty, published in 1684 a work on glandular swellings entitled *The Adenochoiradologia*, of which the third book, or *Charisma Basilicon*, gives a most interesting account of the healing as practised by the Merry Monarch. John Browne, while he never doubts the reality of the cures, entertains with some favour the explanation that they are due "to the power of fancy and an exalted imagination"—what we should call the "mental factor." A more distinguished contemporary, Richard Wiseman,

Serjeant-Surgeon to the King, will not, however, tolerate such an explanation, and points out, to prove the remarkable healing power of the sacred, royal hand, the fact that children and infants benefit equally with adults from its gracious application. It is to be noted that at this time, however, public opinion was not by any means unanimous as to the efficacy of the cure, for Browne finds it necessary to devote a chapter for the purpose of "Several Doubts Resolved about this Curative Method made by Atheists, Sadducees and Ill-Conditioned Pharisees." The cure was carried out with great system and ceremony. In the first place, such as were to appear before the king came to Whitehall or Windsor with recommendations from physicians of good repute all over England. To obtain access to the royal presence a ticket was required, and was only to be obtained after examination by the surgeon of the king, who satisfied himself that the case was really one of scrofula. Provided with the necessary ticket, the patients, rich and poor alike, presented themselves at Court on a day, usually a Sunday, which had been duly advertised as one for the ceremony of "touching," and the following procedure was enacted:—

The king, having taken his seat, attended by the Lord Bishop of Durham and other persons, certain prescribed passages of Scripture were read. The patients were then brought forward singly by the surgeon, and the bishop, on his knees, presented for each a small gold medal strung upon a white silk ribbon. This medal, intended to be a permanent memento and a protection against future onset of disease, was placed by the king upon the neck of each sufferer, and at the same time the affected part was stroked. Passages from the Book of Common Prayer followed, and the ceremony ended when the king publicly washed his hands in a basin and ewer brought forward by two noblemen.

John Browne's work is particularly interesting by reason of some of the cases that he records, and it appears that the patients recovered not at once, but slowly after the "touching" ceremony, while many required a second application. The present of the gold piece, too, it seems, proved a frequent source of fraud, and, to combat this, the examination by the royal surgeon, and the admission by ticket, had been devised. One can well believe that, as Browne writes, there was "scarcely any city, town or country that could not speak well of his curative faculty," for between May 1660 and September 1664 Charles had "touched" no fewer than 23,621 cases. In 1665-1666, the years of the Plague and Great Fire in London, no records were made by the Keeper of His

Majesties Closet, and there was probably no "touching." Between 1667 and 1682, however, the practice grew even more popular than before, and it is recorded that in all 92,107 cases were ceremoniously "touched" by this monarch. These figures, when we take into account the relatively small population of England at the time, give an idea of the enormous prevalence of the disease.

Various cases are recorded also as having been cured by Charles I. during his lifetime and by handkerchiefs that had been dipped in his blood after his demise. James II. occasionally tried this healing method, but William III. would have none of it. Under Anne, however, the practice was revived, and by her Dr. Samuel Johnson was "touched" for the scrofula from which he suffered. Since, however, he was but two years old at the time, the responsibility for encouraging the superstition rests, not with the Great Cham of literature, but with his mother and with Sir John Floyer,³⁷ the physician who had recommended a visit with the child to Court.

Sydenham (1624-1689), the great apostle of the return to simple and obvious methods in treatment of disease, we may presume had no sympathy with this courtly superstition. He advised a method which presented great originality and which he regards as having been curative of phthisis in several cases of his practice. One of these is given in the *Anecdota Sydenhamiana* as follows:—

"Mr. Lawrence Dr. Sydenham's Nephew after a fever fell into a Cough, & other signs of an incipient Phthisis, (the Morbifick matter being violently translated in upon his Lungs) and at length ye Diarrhœa colliquativa came on: then ye Dr sent him into ye COUNTRY on Horseback, (tho he was soe weak yt he could hardly walk) & ordered him to ride 6 or 7 miles ye first day (w^{ch} he did), & to encrease dayly his Journey as he sh^d be able, untill he had rid 150 miles: When he had travell'd half y^t way his Diarrhœa stopt, & at last he came to y^e end of his Journey, & was pretty weil (at least somewhat better) & had a good appetite: but when he had staid at his Sister's house some 4 or 5 days his Diarrhœa came on again; The Dr. had ordered him not to stay above 2 days at most; for iff they stay before they are recovered this spoils all again; & therefore he betook himself to his riding again, & in 4 days came up to London perfectly cur'd. The same course hath y^e Dr put others upon, especially in Pulmonick Diseases, & wth y^e like Success when all things elce had failed him: & he was not ashamed to own y^t he was fain to borrow a cure

from this way now & then when he found himself puzzled with some lingering Distemper not reducible to a common & know (*sic*) Disease." ³⁸ This "riding cure" of Sydenham may be regarded as a type of early fresh-air treatment.

Cullen ³⁹ (1710-1790) was one of the most influential teachers of the eighteenth century, and his method of treatment may be taken as the type which prevailed universally throughout the eighteenth and early nineteenth centuries. He accepts the view introduced some half a century before his time by Sylvius, that tubercles are small glands scattered through the lung, and that the disease is accordingly to be lessened by preventing in every way their inflammation. The methods he adopts are:—(1) Blood-letting; (2) the administration of a lowering diet, especially of vegetables, together with lowering medicines, of which tartar emetic continued for a century and a half to be the favourite; (3) the avoidance of irritation to the affected lung such as might be caused by great exercise, by any position of the body which produced a compression of the chest, and by the access of cold air to the surface which was apt to cause, he thought, inward congestion. Thus the patient was reduced as much as possible by this "antiphlogistic" treatment, and was kept heaped with clothing and enclosed in a warm room, where he respired over and over again the emanations of his own body.

A curious method of treatment, which owed its origin to a special theory as to the nature of tubercles, and which obtained a considerable amount of acceptance, was that introduced by Reid ⁴⁰ in his essay on "Phthisis Pulmonalis" in the year 1785. As he insists that tubercles are composed of a viscid secretion wedged in the termination of the bronchial tubes, it is natural that he should recommend a "vomit" for their expulsion. "Patients," he says, "at first are apt to be alarmed at the novelty of the practice, fearing that by taking pukes every day the tone of their stomachs will be injured, and such ideas never want support from the ignorant and interested; but I can safely affirm, and I am warranted to do so by the best of all tests—experience—that I never saw any bad effects from a course of this kind continued for several months with proper precautions; on the contrary, I have scarcely met with one instance where the general health was not materially improved." Ipecacuanha is therefore his great remedy for consumption, administered to cause vomiting morning and evening every day, while he attributes the well-known success of sea voyages to the sea-sickness entailed!

Surgical treatment by the knife was recommended, as we have seen, by Celsus, for enlargement of the glands. For this purpose the Arab surgeon, Abulcasim ⁴¹ (*circa* 1000 A.D.), adopting the instrument favoured by the prophet, used a hollow tube-shaped cautery. Towards the end of the eighteenth century the method of treating tuberculous areas with "issues" produced by caustics or by setons was introduced by Pott for the cure of that spinal disease which still bears his name. With regard to the "white swelling," a name given by Richard Wiseman to the scrofulous disease of joints, Sir Astley Cooper, in the 1830 edition of his work on the *Principles of Surgery*, states only the alternatives of amputation and of expectation with good diet and counter-irritation; though Syme, the Edinburgh surgeon, in the following year (1831) brought out his *Treatise on Excision of Diseased Joints*.

Treatment continued much on Cullen's lines till late in the nineteenth century. In 1840 a village doctor, named George Bodington, published an essay on the result of his treatment of numerous phthical patients at Sutton Coldfield in Warwickshire.⁴² Bodington lived at Driffold House in this town from 1836 to 1868, and during this period he attracted so many patients that he was obliged to take in addition Maney House, with a large garden attached, which may therefore be regarded as the first real sanatorium for open-air treatment. Its novelty, which included a stimulating regimen and the respiration of a maximum amount of dry fresh air, will be indicated by two extracts from his treatise:—

"In order, then, to restore a consumptive patient, it will be necessary especially to attend to the following matters:—We shall find, first of all, a rapid and weak pulse, ranging from 120 to 140 beats in a minute, clearly indicating a deficient supply of blood, and the heart and arteries irritable in proportion to this deficiency. This condition must be met at once, not by the means termed 'antiphlogistic,' but with frequent supplies, in moderate quantities, of nourishing diet and wine; a glass of good Sherry or Madeira in the forenoon, with an egg, another glass of wine after dinner, fresh meat for dinner, some nourishing food for supper, such as sago, or boiled milk, according to the taste and digestive powers of the patient. This will be supplying means to rectify the morbid condition of the nutritive functions, and to allay the irritability of the heart and arteries. I have generally succeeded in the course of a few days, or perhaps a week, in reducing the pulse from 130 or 140 down to 90, by means of this diet, and by

a systematic use of sedative medicines, and other means. . . . I come now to the most important remedial agent in the cure of consumption, that of the free use of a pure atmosphere; not the impure air of a close room, or even that of the house generally, but the air out of doors, early in the morning either by riding or walking; the latter when the patients are able, but generally they are unable to continue sufficiently long in the open air on foot, therefore riding or carriage exercise should be employed for several hours daily, with intervals of walking as much as the strength will allow of, gradually increasing the length of the walk until it can be maintained easily several hours every day. . . . The cold is never too severe for the consumptive patient in this climate: the cooler the air which passes into the lungs, the greater will be the benefit the patient will derive. Sharp frosty days in the winter season are most favourable. The application of cold pure air to the interior surface of the lungs is the most powerful sedative that can be applied, and does more to promote the healing and closing of cavities and ulcers of the lungs than any other means that can be employed."

His method, however, was received with adverse criticism and ridicule, and though he continued to practise it himself in his private sanatorium, it never obtained much recognition from his contemporaries. The method was practically revived by Henry MacCormac of Belfast in 1865, the keynote of his system being given in his words:—"Tubercle is simply impossible in the case of persons who respire habitually air not pre-respired, and who sleep in an atmosphere incessantly renewed. . . . Pure respiration is the law of life, impure respiration is the law of death. . . . The materials for the possible recovery from phthisis, I repeat, lie round every door." Upon the foundation, laid by these pioneers, has been built up the modern sanatorium system. One of the greatest steps in advance upon this line was recently taken by the German Legislature, which made it possible to bring fresh-air treatment within reach of the humblest dwellers in crowded towns by permitting insurance companies to found large sanatoria in that country for the more economical treatment of work-people insured with them.

Another essential adjunct in the attainment of this end was found in the Consumption Dispensaries which sprang up in the large towns during the last two decades of the nineteenth century, for the purpose of systematically investigating the conditions of the disease in the dwellings of the poorer classes, and of forming controlling

centres to advise the sick and their friends, to select those suitable for hospital, and to supervise patients after their return home. To Edinburgh belongs the credit of having been the first city to possess a large institution of this type in the Victoria Dispensary for Consumption, founded there by Philip ⁴³ in 1887.

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THE Victoria Jubilee Cullen Prize for the greatest benefit done to practical medicine by a Fellow, Member, or Licentiate of the College, which is awarded by the Royal College of Physicians of Edinburgh once in four years, has this year been awarded to Dr. R. W. Philip, for his work on tuberculosis.

THE COAGULATION TIME OF THE BLOOD IN DISEASE.

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THIS subject is one to which, until recently, not much attention has been directed. It is true that in the days when bleeding was in general use, inferences as to the clinical condition were drawn from the time of formation, size, and form of the clot, but in the absence of an appreciation of how largely these factors vary under even slight differences in external conditions, the conclusions were not well founded, and do not appear to have been of much practical worth.

In 1875 Vierordt¹ produced his method, and gave the first list of coagulation times in disease, but the results were variable and inconstant. Some years later Hayem,² using another method, was led to the conclusion that, as a general rule, coagulability was diminished in acute febrile conditions. In 1893 Wright and others³ published the first of a series of papers on the subject, in which the time was shown to be shortened during convalescence from typhoid fever, and lengthened in cases of urticaria, chilblains, physiological albuminuria, and a certain type of headache. Milian,⁴ on the other hand, thought that no clinical method could give any reliable measure of the coagulability of the blood, since such large variations were introduced in the passage of the blood through the tissues. He was supported in this view by an elaborate and painstaking study made with his method by Jacquot,⁵ who also demonstrated the importance of several other factors which were apt to lead to error. Some of these sources of error were excluded in the method of Sabrazès used by Geneuil,⁶ but the results still showed considerable variability. Pratt,⁷ with Brodie and Russell's instrument, was unable to obtain any definite results, and concluded that the experimental errors were far larger than any pathological differences. With the same method, Murphey and Gould⁸ found no change from the normal in the coagulation time in catarrhal jaundice, and Hinman and Sladen,⁹ who besides this method also employed a modification of Milian's method, confirmed this, but found the time slightly longer in cholelithiasis and sometimes much longer in malignant jaundice. Morawitz and Bierich¹⁰ with another method arrived at the same result.

Turner,¹¹ who examined a very large number of cases of epilepsy, found, on taking an average, that there was an increase in coagulability, and was thus unable to confirm the work of Besta¹² and Perugia,¹³ who say that it is diminished. Douglass¹⁴ found the time normal in eclampsia. Solis-Cohen,¹⁵ in a general study of the effect of disease with Wright's method, found that his results were very inconstant, and with a modification of Milian's method was also unable to attain any certainty as to changes in coagulability in cases of tuberculosis. Robertson, Ilman, and Duncan¹⁶ obtained coagulation times rather longer than normal in the febrile stage of the infectious diseases, including typhoid. Ciuffini¹⁷ states that the time is lengthened in purpura and in malignant disease of the liver, and shortened in typhoid. Denk and Hellmann,¹⁸ in some cases which gave a history of easily produced bruising and recurring epistaxis, found the coagulation time longer than normal.

There is thus no very general agreement among different observers, either as to actual conclusions, or even as to the value of the results as indications of the real coagulability of the blood. This must, I think, be attributed to the fact that the pathological variations are small, and the variations due to experimental error large. There is only one disease as to which all recent observers are agreed, *i.e.* hæmophilia. Here the prolongation of coagulation is so great that it cannot be obscured by error, no matter what method is used.

It is obvious that, before entering into the study of the effect of disease, the coagulation time under normal conditions must first be observed, in order that any physiological variations due to age, food, sex, &c., may not be confounded with pathological changes.

This has already been done by means of another method,¹⁹ and I have been able to show that none of the factors mentioned above have any perceptible effect, so that the coagulation time is remarkably constant, and that there is no such thing as a normal daily variation, or that, at any rate, if it does exist, it is so slight as to escape detection even in a chart of the coagulation times at different periods of the day, based on over three hundred observations on different people. These points have recently been confirmed by Hartmann.²⁰ The way is thus clear for an investigation of the present subject.

The method used was the modification of McGowan's method, which I have already described in detail;²¹ but there are two

points in connection with it which further experience has shown to be of importance. The first is, that the results cannot be relied on if the room temperature is above 20° C. (68° F.). On hot summer days the temperature in a ward often rises above 20° C. Coagulation times taken under such conditions were found to be shorter than normal, although the temperature within the apparatus was kept at 20° C. The higher temperature outside must therefore have accelerated the coagulation, although it only had an opportunity to act during the relatively short time during which the tubes were removed from the apparatus for examination. It follows that some degree of error must arise from variations of temperature between 15° C. and 20° C. A large part of the differences in the coagulation times of people in health was no doubt due to this cause. At the same time it is a cause of error which, so far as I can see, it is impossible to avoid with this method, and it must be remembered that ward temperatures, except on exceptionally warm days, seldom fall or rise beyond the limits of 14° C. (57° F.) and 17° C. (63° F.).

Secondly, it is impossible to lay too much stress on the importance of adopting a method of obtaining the blood which in all cases will give an equally rapid flow of blood. The necessity for this is due to the fact that the amount of thrombokinase in the blood flowing from a wound is mainly determined by the length of time during which it has been in contact with the exposed tissues in the wound. The amount of thrombokinase is, of course, one of the most important factors which determine the coagulation time; so that if constancy is not attained in regard to this point, the results will be very variable and unreliable. This is only possible if in all cases the conditions are such that there is no perceptible interval between the making of the puncture and the appearance of the blood. The one must follow the other instantaneously. These conditions are often not naturally present. No matter how deep a puncture is made into fingers which are cold, the blood will not flow immediately. A constant circulatory condition must first be established by the immersion of the patient's hands in hot water, or by means of hot water bottles, &c. A slip-knot on a bandage is then placed loosely round the base of the fingers. Just before the puncture is made the knot is tightened, and the bandage is wound rapidly and fairly firmly round the finger as far as the distal end of the second phalanx. The blood is thus driven to the end of the finger, which becomes for the moment engorged with blood. The puncture is now made

on the extensor surface near the nail. Under these conditions a slight and quite painless prick with a Jenner's vaccinostyle is sufficient in all people except very small children to produce a large drop of blood. A tube which has been held ready is applied and the blood allowed to run in as quickly as possible, the other end is closed with sealing-wax and it is placed in the apparatus. Practice soon enables one to carry out this process in a constant and uniform manner. The employment of such means of obtaining a constant circulatory condition has been avoided by workers on this subject, because it has been several times authoritatively stated, although without any satisfactory proof, that it tends to squeeze out a greater quantity of thrombokinase from the tissues, and so leads to acceleration of the coagulation. But on examining the point experimentally, I found that the use of much greater pressure than is here described did not have such an effect, and that the only important factor in determining the amount of thrombokinase was the rate of outflow of blood from the wound.¹⁹

In the paper in which the method was described I gave the limits of error as lying between 8 min. 45 sec. and 11 min. 41 sec. These were the longest and shortest times found in fifty-one consecutive daily observations on one person.

It is obvious, however, that this is a very narrow basis on which to determine such a question, as it neglects errors possibly arising owing to difficulties in obtaining blood in exactly the same manner from different people. It was also necessary to find whether there were differences in the coagulation times of normal people, for if this were the case, it would not be possible to conclude that variations found in disease were due to disease alone. It is true that when working with a more accurate method I had not found any indication of the existence of such differences in normal coagulation times, but the number examined was not so large as to allow of a definite conclusion on this point.

For these reasons sixty-six normal people were examined. This number included some surgical patients with conditions such as varicose veins, hernia, &c., which did not interfere with their general health. With three exceptions, the times were within the provisional limits of error which I have given, and with nine exceptions they were between 9 min. and 10 min. 45 sec. These observations were, as a rule, not made in wards, but in rooms where the temperature was less constant, and the majority were carried out during the height of summer, when fluctuations of room temperature are most marked. I did not at the time fully

realise the importance of changes of temperature external to the apparatus, and probably, if attention had been paid to this point, the variations would have been less pronounced. I think that the possibility of these differences indicating true variations in the coagulation times of normal people may be laid aside, since they are entirely similar in extent to the differences found in consecutive observations on one person.

It was only possible to make further observations on four out of the nine cases which were less than 9 min. or more than 10 min. 45 sec., but in each of these the time was later found to be within the normal limits.

Therefore, although in view of the small number examined, one cannot definitely say that appreciable differences as regards the rate of coagulation in healthy people do not exist, it is justifiable to conclude that they must in any case be rare.

The average of these coagulation times was 9 min. 51 sec., so in judging the coagulation time in disease the rule is followed of calling it normal if it lies between 9 min. and 11 min. On the other hand, if a time shorter or longer than these is found, it is not described as abnormal and due to the pathological condition present, unless it has been confirmed in subsequent examinations.

CASES IN WHICH THE COAGULATION TIME WAS NORMAL.

Out of one hundred and twelve cases, seventy-six, or about 70 per cent., were normal. This does not mean that only 70 per cent. of all hospital patients have a normal coagulation time, but rather that in 70 per cent. of those whose general condition was most profoundly altered by disease, there was nevertheless no abnormality in coagulation, for, as a general rule, cases of severe and advanced disease were selected for examination.

The following is a list of the conditions in which such normal times were found:—Diabetes (2 cases); myxedema; exophthalmic goitre; parenchymatous degeneration of the thyroid; extensive burn; lead poisoning; carcinoma (6 cases); sarcoma; catarrhal jaundice (2 cases); cirrhosis of the liver; abscess of the liver; colitis (2 cases); cardiac disease with anasarca (2 cases); thrombosis (6 cases); chlorosis (3 cases); severe secondary anaemia; pernicious anaemia; tuberculous infections (12 cases); pneumococcal infections (3 cases); mixed pyogenic infections (12 cases); rheumatic cases (7); syphilis; malaria; pemphigus; urticaria (2 cases); locomotor ataxia; alcoholic neuritis.

In some of these normal cases there were very marked and

obvious chemical, physical, and morphological changes in the blood.

For instance, in one of the cases of diabetes, lipæmia was so pronounced as to cause a change in the colour of the skin, and to lead to a remarkable alteration in the appearance of the retina. The serum looked exactly like milk. In this patient repeated observations always showed a normal coagulation time, even during the course of diabetic coma. Again, no relation appeared to exist between the viscosity of the blood and its coagulation time. A rough indication of the viscosity was given by the rate of flow of the blood into the capillary tubes. Minor variations were of course lost sight of, but in cases where great differences existed, such as were found, for instance, in pernicious anæmia, the alteration in the rate of flow was very striking. Nevertheless, delayed, normal, and accelerated coagulation times were all observed in different cases where there was undoubtedly an increase or decrease of viscosity.¹

No evidence was obtained of any connection between leucocytosis and coagulability. Here, also, all varieties of coagulability were seen, both in cases with and without leucocytosis.

A few cases were met with who gave a history of frequent epistaxis, very easily produced bruising, &c., but the coagulation time was always normal. On the other hand, a slightly decreased coagulability was found in the case of a girl who had had previously two attacks of purpura, and had also suffered from hæmaturia, for which no cause could be found. Seven cases of thrombosis were examined. With one exception, the coagulation time was normal.

Finally, it may be noted here that none of the various drugs which were given appeared to have any effect on the coagulability of the blood. Determinations made for a considerable time before and after subcutaneous injections of normal saline solutions of antistreptococcal and of antipneumococcal sera (age not known) made it clear that these also were without effect.

CASES IN WHICH ABNORMAL COAGULATION TIMES WERE FOUND.

The diseases from which these patients suffered were as follows:—Typhoid fever (10 cases); mixed pyogenic infections

¹ The belief that there is a connection between viscosity and coagulation is due, I think, to the fact that, unless the special precautions I have mentioned are taken, when the blood has an increased viscosity, it takes a longer time than usual to flow from a wound, and takes up more thrombokinase, and so gives a shorter time than normal blood, or blood in which the viscosity is low.

(9 cases); diseases of the liver (2 cases); diseases of the blood (3 cases); pneumococcal infections (3 cases); acute rheumatism (3 cases); diseases of the kidneys (4 cases); hæmorrhages (4 cases).

Hereditary hæmophilia is not included in this list, as I hope soon to publish the results of an investigation into the cause of the extraordinary delay in coagulation which occurs in this disease, and the coagulation times will there be given in full.

TYPHOID FEVER.

In all of the ten cases the coagulation time was shorter than normal during the acute stage.

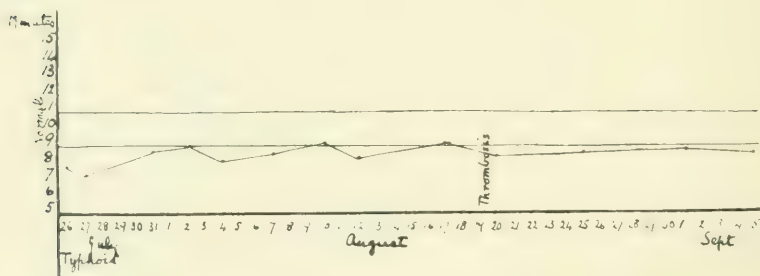


CHART 1.

The above chart shows the course of the coagulation curve in one of them.

In the other cases which were followed out the time became normal as convalescence set in, and there was no thrombosis, but in this case the time remained short, and there was thrombosis of the left internal saphena vein. It is, of course, impossible to say, unless a large number of cases were examined, whether there is any connection between this continuance of an increased coagulability of the blood and the occurrence of thrombosis, but the conjunction is suggestive, and would seem to be worthy of investigation.

In every case the coagulation time was below the normal during the acute stage. If this should be found to be constant in typhoid, it might turn out to be a point of some diagnostic importance, for it seems to be present before a positive Widal sign has developed. In several cases which were sent in as early typhoids, the coagulation time was found to be normal, and in all

of these cases the subsequent course of the illness, and the non-appearance of the Widal sign, showed the diagnosis to be mistaken.

The coagulation times in the other cases, taken as a rule every second or third day, were as follows:—

CASE 2.—8 min. 5 sec. 8 min. 0 sec. 8 min. 15 sec. 8 min. 52 sec. 10 min. 30 sec. 11 min. 25 sec.

CASE 3.—7 min. 30 sec. 9 min. 10 sec. (Death.)

CASE 4.—6 min. 35 sec. 8 min. 0 sec. 8 min. 50 sec. 8 min. 45 sec. 9 min. 15 sec. 9 min. 0 sec.

CASE 5.—7 min. 20 sec. 7 min. 30 sec. 7 min. 50 sec. 8 min. 30 sec.

CASE 6.—7 min. 50 sec. 8 min. 25 sec. 8 min. 30 sec. 8 min. 40 sec. (Death from hæmorrhage.)

CASE 7.—8 min. 10 sec. 7 min. 25 sec. 9 min. 15 sec. 8 min. 55 sec. 9 min. 45 sec. 8 min. 52 sec. 10 min. 30 sec. 10 min. 20 sec. 9 min. 52 sec.

CASE 8.—7 min. 30 sec.

CASE 9.—6 min. 10 sec. (Death from perforation.)

CASE 10.—8 min. 25 sec.

PNEUMOCOCCAL INFECTIONS.

The coagulation curve of the first case is given below, and it will be noted that the coagulation time remained steadily below the normal.

The patient was a middle-aged man who was admitted on the sixth day of an attack of double lobar pneumonia. The right knee-joint was full of pneumococcal pus. During the course of his illness several subcutaneous abscesses and a right-sided empyema developed, but in spite of all this his condition gradually began to improve, and he ultimately completely recovered, with the exception of some stiffness in his knee.

There are some grounds for supposing that the pneumococcus in some way induces or accelerates coagulation. Thus it is especially in pneumococcal pleurisy and peritonitis that large masses of fibrin are found in the exudate, and it is typically in pneumococcal pneumonia that the coagulation of the exudate in the alveoli leads to the firm consolidation of the lung. The above case of pneumococcal pyæmia supports this view. But when the disease is localised, no constant general effect on the coagulability of the blood is recognisable. In two cases of

pneumococcal empyema, the time was normal. Of three cases of lobar pneumonia, one was normal, in the other the coagulation curve was slightly irregular, and in the third, a case in which observations were commenced on the second day of the disease, before

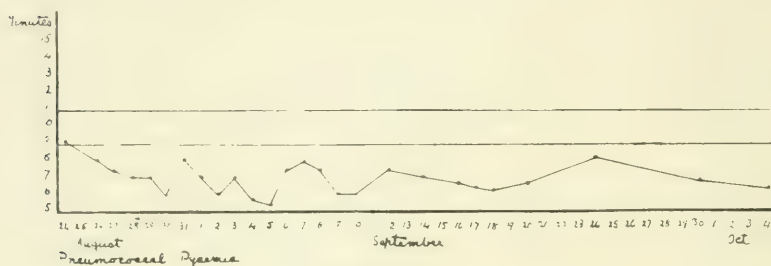


CHART 2.

there was any recognisable pulmonary consolidation, the coagulation time was at first above normal, and afterwards fell below it.

STREPTOCOCCAL AND STAPHYLOCOCCAL INFECTIONS.

In twelve cases of severe localised septic infection the time was normal, whereas in the three cases of septicaemia which came under observation, coagulation was delayed.

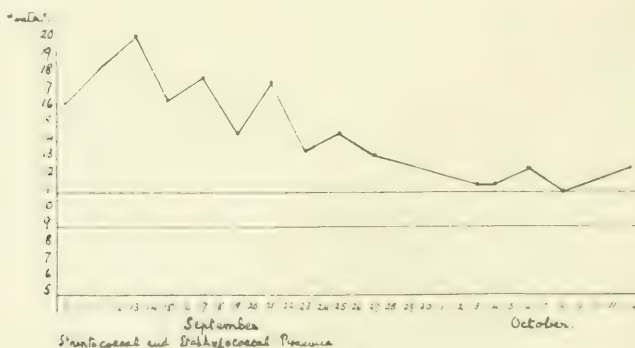


CHART 3.

The first case, whose chart is given above, was one of pyæmia, following on puerperal infection. Staphylococci and streptococci were found in the pus removed from freshly-opened abscesses.

The second case was found post-mortem to be one of ulcerative endocarditis. Streptococci in large numbers were present in the

urine. Daily observations during the six days he lived after admission showed a coagulation which remained steadily at, or slightly above, 13 minutes. The third case was admitted in a moribund condition. There was a pulmonary abscess, and pus was present also in one of the wrist joints. Times of 14 min. 20 sec. and 13 min. 35 sec. were found. It was in connection with the first two of these cases that a striking phenomenon was observed, which was due, I think, to an agglutination of the red blood corpuscles. After having been in the glass capillary tubes for only a few minutes, the blood had already begun to separate into two layers, the upper of plasma and the lower of red blood corpuscles. After eight minutes or so the length of the column of plasma was often half that of the total length of the original column of blood. With the naked eye the corpuscles could sometimes be seen to be collected into clumps, and the separation of the plasma appeared to be due to this aggregation of the corpuscles into bodies which quickly sank under the influence of gravity. It was only in these two cases that it was so marked, but the separation of $\frac{1}{16}$ to $\frac{1}{4}$ of an inch of plasma occurred in all cases of septic infection in which the symptoms of disturbance of the general condition were at all prominent. In such cases it gradually disappeared as the general health improved. It was present in moderate degree in acute rheumatism, very slightly in pneumococcal infections. The only bacterial disease in which it was quite absent was typhoid. Of non-bacterial diseases, it was well marked in a case of uræmia, and slightly present in three cases of acute nephritis, and in one case of cirrhosis of the liver. This agglutination of the red blood corpuscles is of interest in connection with some recent experimental results. Pearce and Winne²² found that they could produce agglutination of the corpuscles of animals by the injection into the blood-stream of the filtered autolysed products of several varieties of organisms. Boxmeyer²³ produced small areas of necrosis in the liver after injecting the hog-cholera bacillus. He showed that this necrosis was associated with "hyaline thrombi" composed of agglutinated corpuscles. Finally, Flexner²⁴ has come to the conclusion that many poisons which have a destructive effect on the red blood corpuscles are productive also of their agglutination, and that a specific variety of thrombosis by means of masses of agglutinated corpuscles may result. He believes that this may be a cause of thrombosis in disease.

RHEUMATIC CASES.

In severe cases of rheumatic fever the coagulation time is slightly delayed. Times of 11 min. 15 sec., 11 min. 10 sec., and 11 min. 45 sec. were found in three cases during the acute stage. One case which passed in turn through endocarditis, pericarditis, and chorea, showed a curve which kept fairly constantly just above the normal limits. A similar chart was given by a case of chorea.

DISEASES OF THE LIVER.

It is especially in advanced disease of the liver that abnormal coagulation times might be expected to occur. In 1904 Doyen and Kareff²⁵ found that the blood became incoagulable when the liver was removed, and this result was shortly afterwards confirmed by Nolf.²⁶ Since then Doyen and others have shown that the loss of coagulability can be produced by the injection into the portal system of substances such as chloroform and phosphorus, which have a specially deleterious action on the liver.

I have examined five cases of very pronounced liver disease, one in which a large abscess was found, two of cancer, and two of cirrhosis. All these cases, except one, died while observations were being made, or shortly afterwards, and post-mortem examination revealed very far advanced disorganisation of the liver. Nevertheless, repeated examinations in three of these cases gave normal times. Of the other two, in one there was perhaps a very slight prolongation of coagulation, as the times were always over 10 minutes, but they only twice went slightly above the normal limits. The other case in which the coagulation was not always normal was one of cancer. The primary disease was in the pancreas, but the liver was studded with large secondary deposits. There was very profound jaundice, and towards the end subcutaneous hemorrhages appeared, and there was hamatemesis. It was therefore all the more surprising to find that the coagulation time, which before this had been normal, sank below the normal limits. The hemorrhages, therefore, obviously occurred in spite of, and not because of, changes in the coagulability of the blood.

At the same time, if a larger number of cases had been examined, some would no doubt have been found to show delayed coagulation. It is very probable that such a condition exists in cases of acute yellow atrophy of the liver, and in chloroform and phosphorus poisoning. At this point the effect of acidosis may be

referred to. Mellanby²⁷ has demonstrated how great a retarding influence on coagulation very minute traces of acid may exert, and one might therefore look for an abnormally long coagulation time in conditions where acidosis is present. The patient with diabetes who died with diabetic coma had throughout a normal time, but large quantities of sodium bicarbonate were given by mouth and subcutaneously, and this may possibly have prevented the development of an irregularity in this respect. A case of cyclical vomiting had a well-marked prolongation of coagulation, but this observation is not of much value, as it was not definitely shown that a condition of acidosis was really present in this particular case. No other examples of the condition came under observation.

NEPHRITIS.

Only five cases of nephritis were examined. Three of them were acute, and all had abnormal times. One subacute case was normal, and one case of fibroid degeneration, the result of lead poisoning, had a normal time until uræmia set in.

Two of the acute cases were interesting clinically because of the unusual severity of the nephritis. The first was a man over middle age, who was admitted in a semi-conscious condition, with a history of not having passed urine for twenty-four hours. Next day his son came with the same complaint, except that in his case it had lasted for forty-eight hours. They were not living together, and had not been together recently—in fact they neither knew that the other was ill until they met in the ward, so that there were difficulties in the way of the otherwise very natural assumption that the same cause had produced both illnesses. Another interesting point was that they belonged to a hæmophilic stock. A first cousin of the father, a hæmophilic, was a patient in the ward at the time, suffering from prolonged and serious hæmorrhage following a tooth extraction.

The father had complete anuria for twenty-four hours after admission, and the son for forty-eight hours. Both were in the same stuporose and semi-conscious condition. The father recovered first, and the only notable thing was the long persistence of a trace of blood in the urine. He never had any œdema, and recovered apparently completely.

The secretion of urine in the son set in very gradually, and he developed moderate œdema, which was very persistent. He was discharged after three months with a trace of albumen in the urine.

Both were bled on admission. The specific gravity of the serum of the father was 1017, and that of the son, 1022. It was surprising to find in cases which, at the commencement at least, were so similar that the coagulation curves were entirely different.

Both are shown on the chart below. The father had an abnormally short coagulation time, which became normal as improvement set in. The son had on the whole a prolonged time. The observations in his case were interrupted before recovery had advanced very far.

The third case of acute nephritis had a slightly delayed coagulation, and gave a curve very similar to this one.



CHART 4.

One of the greatest prolongations of the coagulation time was found in the only case of uræmia which was observed. The patient had been admitted before for lead poisoning, and numerous determinations then had shown the time to be normal. A few weeks later he was again admitted, with the history that he had recently had a "fit." During the short time he lived after admission he was unconscious, and had several convulsions. There was epistaxis, and bleeding from the gums. The coagulation time was 16 min. 50 sec. Post-mortem, the kidneys were found to be very small, and in an advanced condition of fibroid degeneration.

DISEASES OF THE BLOOD.

In one case of severe chlorosis the time was at first slightly above the normal limit, but as improvement set in the times became normal. In the other cases normal times were found.

A case of myelogenous leukemia had a coagulation time of 5 min. 25 sec., but only one observation was possible, as the patient died on the day after admission.

Two cases of pernicious anemia were examined, both of which on admission had less than 1,000,000 red blood corpuscles.

In one the time was normal, and in the other it was persistently short, in spite of a very great improvement in the blood condition (see Chart 5).

HEMORRHAGES.

The fact that after large hæmorrhages the blood coagulates more quickly than before, has been known since the time of Hewson,²⁸ and in recent times has been confirmed by Arloing,²⁹ Arthus,³⁰ and Milian.³¹ The cause is unknown. Von den Velden³² has indeed attempted to explain it, on the assumption that the fluids from the tissues which enter the vessels to replace the lost blood contain thrombokinese, but apart altogether from the

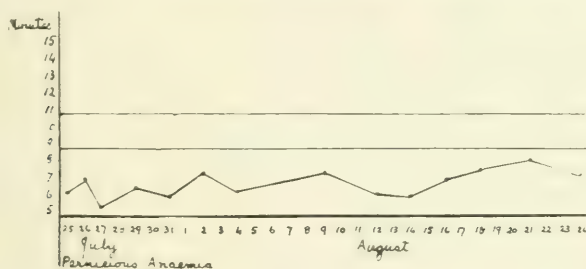


CHART 5.

difficulty of accepting this, in view of the well-established facts on which the present theories of coagulation are based, his argument is anything but convincing. In animals it has been shown that very large quantities must be lost before there is any appreciable effect, and the one or two observations which I had an opportunity of making, fully bear this out.

The removal of a pint of blood from a vein for therapeutic purposes was in three cases entirely without influence on the coagulation time. But there were two cases in which large and dangerous hæmorrhages occurred, and in these an acceleration of coagulation was seen. The first case was one of hæmorrhage from a gastric ulcer, which very nearly proved fatal. The blood coagulated in 5 min. 30 sec., five days later the time was 8 min., and eleven days afterwards it was 8 min. 30 sec. Nearly a month after the hæmorrhage the time was still below the normal limit.

The other case was one of very severe hæmorrhage following an operation for the removal of tonsils and adenoids. The coagulation time was 7 min. 7 sec.

Two other cases appear to show that long continued and

constant loss of blood may produce the same effect. A case of cancer of the bladder, who had had hæmaturia for three months, and who was very anæmic, gave coagulation times of about 8 min., and in the case of a man who had suffered from dysentery for years, and who had very frequent blood-stained motions, a coagulation curve was found which remained constantly well below the normal.

CONCLUSIONS.

The number of cases which have been examined is too small to permit of any wide conclusions being drawn as to the effect of disease on coagulation, but one striking fact is at any rate clear, namely, that in spite of extreme morphological, physical, and chemical alterations in the blood, the coagulation time may nevertheless remain normal. As regards the cause of those abnormalities of coagulation which were observed in non-bacterial diseases, nothing can be said. The first step towards such knowledge would have to be the establishment of the constancy of these changes, or if they were inconstant, the search for the conditions under which they appeared.

But in bacterial diseases it may be concluded that no marked effect is produced unless the organisms are actually present in the blood. When this occurs, the typhoid bacillus and the pneumococcus hasten coagulation, while streptococci and staphylococci delay it.

Auto-agglutination of the red blood corpuscles was seen in varying degree in all acute bacterial infections, except typhoid. It was most marked in cases of staphylococcal and streptococcal septicæmia and pyæmia.

Moderate loss of blood has no effect on coagulability, but very large hæmorrhages are followed by an acceleration of coagulation.

I am indebted to the staffs of the Royal Infirmaries of Gloucester and Bristol for the opportunity of making these observations.

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CLINICAL RECORDS.

TRAUMATIC ARTERIO-VENOUS ANEURISM OF RIGHT ORBIT WITH PULSATING EXOPHTHALMOS CURED BY LIGATURE OF THE COMMON CAROTID ARTERY.

By J. M. COTTERILL, *M.R.C.S.*,
Surgeon to the Royal Infirmary, Edinburgh.

J. S., *æt.* 31 years, was sent to me by Dr. George Mackay, Ophthalmic Surgeon to the Infirmary, for the treatment of a pulsating tumour of the right orbit, causing marked proptosis.

In July 1905, whilst driving a dog-cart, the patient was thrown out, striking the left side of his occiput with great force on the ground. He was unconscious for eight hours, and on recovering his senses felt great pain in the head and loud whistling noises in both ears.

On the fifth day marked proptosis of the right eye was noticed by the patient, and the eye could not be closed. Vision was dim, and there was diplopia. There was convergent squint, and the centre of the cornea could not be rotated outwards beyond the mid-line, owing to paralysis of the sixth nerve.

A considerable swelling existed round about the eye, and a loud bruit could be heard over the tumour and over the whole of the right anterior part of the head.

Dr. Mackay reported that some congestion of the veins of the left fundus was present, as also cloudiness of both discs.

Under treatment by iodide of potash, some slight improvement took place as regards the proptosis, but as the tumour tended to increase in size, surgical treatment was decided upon.

It was under discussion as to whether ligature of the angular vein, as suggested by Mr. Burghard, should be tried; but I decided to ligature the right common carotid, as pressure on that vessel appeared completely to stop the pulsation.

This operation was accordingly done on the 18th of June 1907, about two years after the accident.

On the day following the operation some pulsation could still be felt, but the thrill had disappeared. Matters remained much the same till the 30th July, on which day there was a sudden and marked diminution in the size of the swelling round the eye, and the patient described his having experienced a curious sensation in the part, as of cold water being poured over it.

Since that date all pulsation and thrill have been entirely absent, and a complete cure has resulted.



Case of arterio-venous aneurism of right orbit.



There still remained slight internal squint, for which further treatment has been carried out in the eye wards, only five degrees of convergence being left.

PISTOL-SHOT WOUND OF THE ABDOMEN.

By ALEXIS THOMSON, M.D., F.R.C.S.,
Professor of Surgery, University of Edinburgh.

THE patient, a man aged 40, was admitted to the Royal Infirmary on the 13th of August 1909. While engaged at a miniature rifle range, a pistol was being handed to him when it went off without warning and he was shot in the lower part of the abdomen. He sank to the ground complaining of intense pain. I saw him about ten minutes after the occurrence; he was propped up against the wall of the room, groaning with pain, and blanched in the face. On exposure of the injured region it was noticed that the abdominal wall did not move with respiration and that there was a small rounded aperture in the centre of the left rectus about two inches below the umbilicus. There was no singeing, but some bruising of the edges; there was no external hæmorrhage worth speaking of. Within an hour of his being shot I opened the abdomen in the middle line and found, in the first instance, a quantity of blood, some of it clotted, lying upon the intestines; most of this had been derived from a perforation of the deep epigastric artery caused by the bullet as it traversed the parietes. Having removed this, the small intestine was searched throughout its entire length, and six perforations were found, all of which were capable of admitting the tip of the little finger, showed eversion of the mucous membrane, and some leakage of intestinal contents. At two other points there were bruises on the surface of the small intestine, where apparently the bullet had merely grazed the bowel. The perforations were closed in the usual way, the stitches being inserted at right angles to the long axis of the bowel; the grazed portions were simply invaginated. The operation was rendered difficult by the distension and vascularity of the intestines, he having had a full meal about five hours before. The soiled portions of peritoneum were cleansed with portions of moist gauze, and the abdomen closed without irrigation or drainage. He made a smooth recovery, and left hospital for his own home on the fourteenth day.

A skiagram showed that the bullet was embedded in the soft parts in front of the right hip joint. When shown at the Medico-Chirurgical Society's meeting six months later he declared himself to be in perfect health.

A CASE OF DISEASE OF THE PITUITARY, WITH SYMPTOMS REFERABLE TO THE THYROID AND OVARY (PLURIGLANDULAR SYNDROME).

By J. EASON, M.D., F.R.C.P.,
Physician, Leith Hospital.

WITH OPHTHALMOLOGICAL REPORT.

By J. V. PATERSON, M.B., F.R.C.S.,
Assistant Ophthalmic Surgeon, Royal Infirmary.

MRS. R., æt. 34, has complained of difficulty in vision since June 1906, otherwise she feels very well, and is always able for work. She states also that she has not menstruated since she was 28 years of age. She had scarlet fever at the age of 16. In the year 1905 she suffered severely from headaches, but after the removal of some decayed teeth in that year the headaches ceased. The difficulty of vision began a few weeks before she was married in 1906. Her family history is very good. There is no history of tuberculous disease in the family, nor is there any evidence of epilepsy. I formed the opinion that she had neither congenital nor acquired syphilis.

General Appearance.—She is of stout frame, and, for one of her years, is decidedly obese. Her weight is 11 st. 6 lbs.; she has gained 7 lbs. in weight within the last two years—principally in the later part of this period. Her waist circumference is 29½ inches, her circumference at the level of the umbilicus, 38 inches. The features are broad, the skin of the face pale and opaque, and on the nose the texture of the skin is coarse. The hands and feet are broad. The fingers somewhat resemble the sausage-shape of acromegaly. The hair of the head is long but slightly scanty. The axillary hair is distinctly less than normal, while the pubic hair is average. Perspiration seems subnormal, but only slightly; three years ago the sweat glands seemed much less active. There is no pigmentation of the skin of abnormal distribution.

The condition of the *alimentary system* appeared to be entirely normal.

Circulatory System.—Pulse 45. There is no œdema, dyspnoea, or faintness. She complains of flushings, during which the pulse becomes more frequent but soon again resumes its slow rate. When the patient is in bed the pulse-rate has sometimes been 40. The heart sounds are normal. Recently she has complained of mild Raynaud's symptoms, which are felt after a spell of knitting. The fingers then become cold.

Hæmopoietic System.—R. BC. 4,500,000; W. BC. 6000; Hb. 80-100 per cent. Films show some increase of lymphocytes. Under the left ear

there is a slightly enlarged gland. The thyroid gland is not palpable. There is no special dullness behind the manubrium nor any symptoms indicative of a large thymus.

Nervous System.—Her smell, taste, and hearing are good. The sensory system is normal. The knee-jerks are equal and normal; the Achilles jerk is present. Babinski's test is negative. Co-ordination is good. She has never suffered from vertigo, and there have been no headaches for several years.

A description of the ophthalmological condition is given by Dr. J. V. Paterson below.

Reproductive System.—She has had amenorrhœa for six years. The mammae are well developed. She has had no pregnancies.

Urinary System.—The urine has been examined only on a few occasions and no abnormal constituents were found. The average amount of urine daily is 40 ozs.

OPHTHALMOLOGICAL REPORT BY DR. J. V. PATERSON.

Mrs. R. consulted me on 10th November 1906 regarding dimness of vision. On examination I found vision with the right eye equal to $\frac{6}{60}$ of Snellen's scale, while that of the left eye was distinctly worse. No definite improvement was procurable with lenses. The fundi appeared normal. The shadow test showed slight irregular astigmatism, but no noteworthy refractive error. The field of each eye was good to hand movements, but fingers were not counted so readily to the outer side of the fixation point. In the left eye a definite central scotoma was readily made out. By the use of a colour test it became at once evident that a complete loss of the colour field to the outer side existed in both eyes (see Charts). The field for white was also considerably reduced. The pupillary reactions were normal.

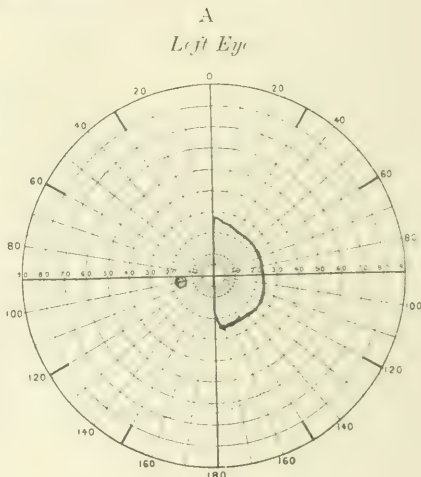
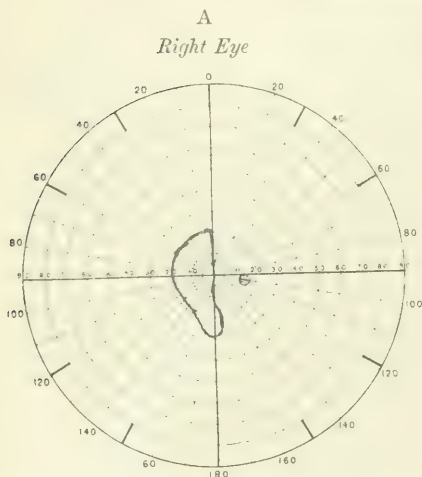
Dr. Eason discussed the case with me, and we both thought that there must be some lesion which was causing pressure on the visual fibres at the chiasma.

I saw the patient again on 4th June 1907, having had reports as to her condition in the interval. Vision by this time had greatly improved (RV = $\frac{6}{12}$, LV almost as good). The right disc appeared normal, the left very faintly blurred in outline and slightly pallid. The fields were charted for red and showed a symmetrical loss of the outer and upper quadrant, while in the lower outer quadrant the loss of colour perception was not quite complete.

On 24th May 1909 she consulted me again, complaining of double vision, which she said had existed for several months. Examination showed that she usually fixed with the left eye, the right diverging 4° or 5° according to the Maddox scale. The separation of the images was about the same in all directions of fixation, and I did not feel sure

whether paresis of any individual muscle existed. The pupils were equal, and reacted normally. The right disc showed slight atrophic changes, while the left disc showed quite marked atrophy. Central vision had not appreciably deteriorated since her previous visit. Examination of the fields now showed loss of the temporal halves, even to hand movements. The defect, which had originally been a relative one, had now become absolute.

Charts showing field for red.



A short consideration of these imperfect notes will, I think, make it abundantly clear that in such a case as this the data obtained from the visual examination are of the highest value in indicating the seat of the disease. We have indeed before us a typical picture of the visual changes brought about by pressure on the chiasma, viz. impairment of central vision with bitemporal constriction of the visual fields, and accompanying these symptoms the visible signs of a slowly increasing optic nerve atrophy.

NOTES ON PROGRESS.

For three consecutive months during July to October 1909 she had thyroid medication, and for a considerable part of this period she had three raw eggs daily; in November she stopped thyroid treatment, as her vision had become worse. She had ovarian tabloids, without any apparent change resulting. During two periods, each of some months' duration, potassium iodide has been given without benefit.

On 26th December 1909 pituitary tabloids, 2 grs. twice daily,

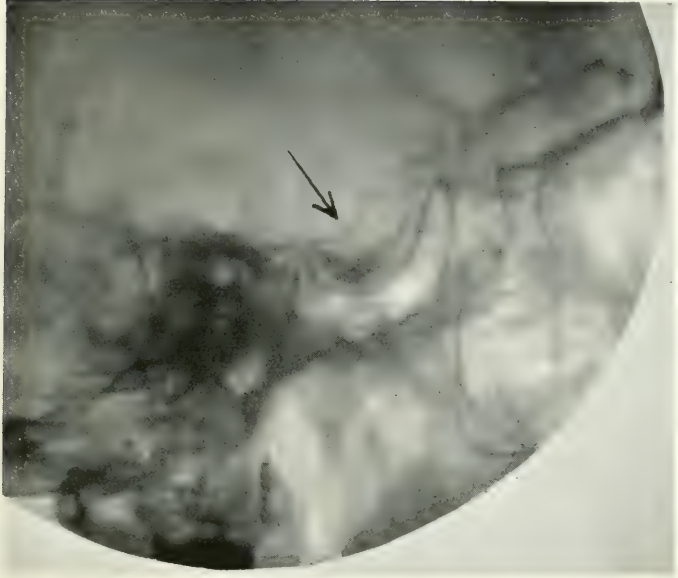


FIG. 1.

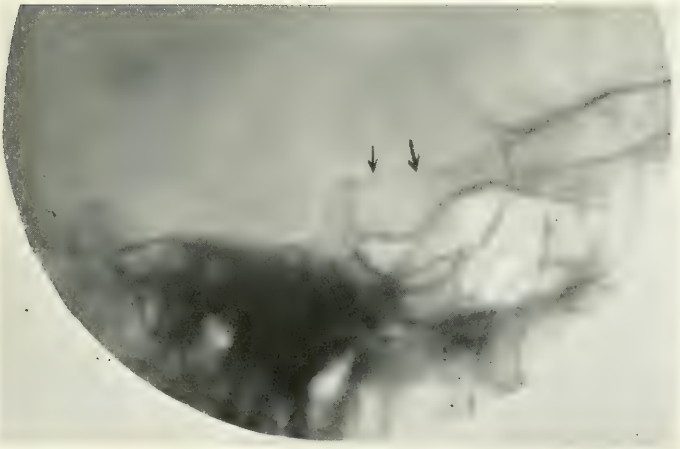


FIG. 2.

Illustrating Dr. EASON'S paper.

were prescribed, and on 13th January following she began to complain of being very drowsy at times, and the nasal field of vision on the left side was affected more than it had hitherto been. An apparent result of this treatment was that urine was voided more freely, and she required to get up at night to micturate. The average daily increase was about 10 ozs. She also increased in weight, although the gain was not entirely maintained towards the latter part of the period in which she was under this treatment. When the administration of pituitary extract was stopped on 13th February, the drowsiness passed off, and she was also able to see a little better. She no longer had need to get up at night to pass urine.

Remarks.—In this case the diagnosis of disease of the pituitary is based on the syndrome of bitemporal hemianopsia and amenorrhoea. These together suffice to distinguish an abnormal condition of the pituitary in which enlargement is a feature. The lengthy history of the case suggests hypertrophy or a benign tumour, and adenoma is by far the most common tumour of the pituitary. That enlargement of the pituitary has occurred is shown in the X-ray photograph of the wide sella turcica (Fig. 1) taken by Dr. Edmund Price. For purposes of comparison a photograph is also shown of the normal sella turcica (Fig. 2). The obesity, the characters of the skin, hair, face, hands, and feet, and the slowness of the pulse may be attributable to changes either in the pituitary or thyroid or in both. It has already been stated that the thyroid was not palpable. The case exemplifies one of the numerous pluriglandular syndromes described by Claude and Gougerot, as there are in Mrs. R.'s case not only indications of functional and organic changes of the pituitary, but also of atrophy and hypofunction of the thyroid and hypofunction of the ovaries. It is difficult to say which of these is primary, but the occurrence of amenorrhoea two years before the defect in vision was complained of is suggestive. One or two cases similar to the above have now been treated in France and Italy by X-rays, taking the mouth as the way of penetration to the pituitary. In one of these cases benefit to the vision and restoration of the fundal vessels to the normal occurred. After a relapse similar treatment had the same beneficial effect as formerly. The acromegalic signs were not influenced. In another case improvement is also recorded.

Operation is now recommended, the indication being severity of pressure symptoms. It is considered to be unjustifiable to operate for the acromegalic condition alone. In the case here recorded I have been hitherto unable to persuade the patient to submit to operation. Hoehenegg, Exner, von Eiselsberg and others have successfully operated on similar cases, with relief to the intracranial symptoms and reduction of the hypervolume of the extremities.

A CASE OF SEPTIC (OTITIC) THROMBOSIS OF THE JUGULAR BULB AND INTERNAL JUGULAR VEIN: OPERATION: RECOVERY.

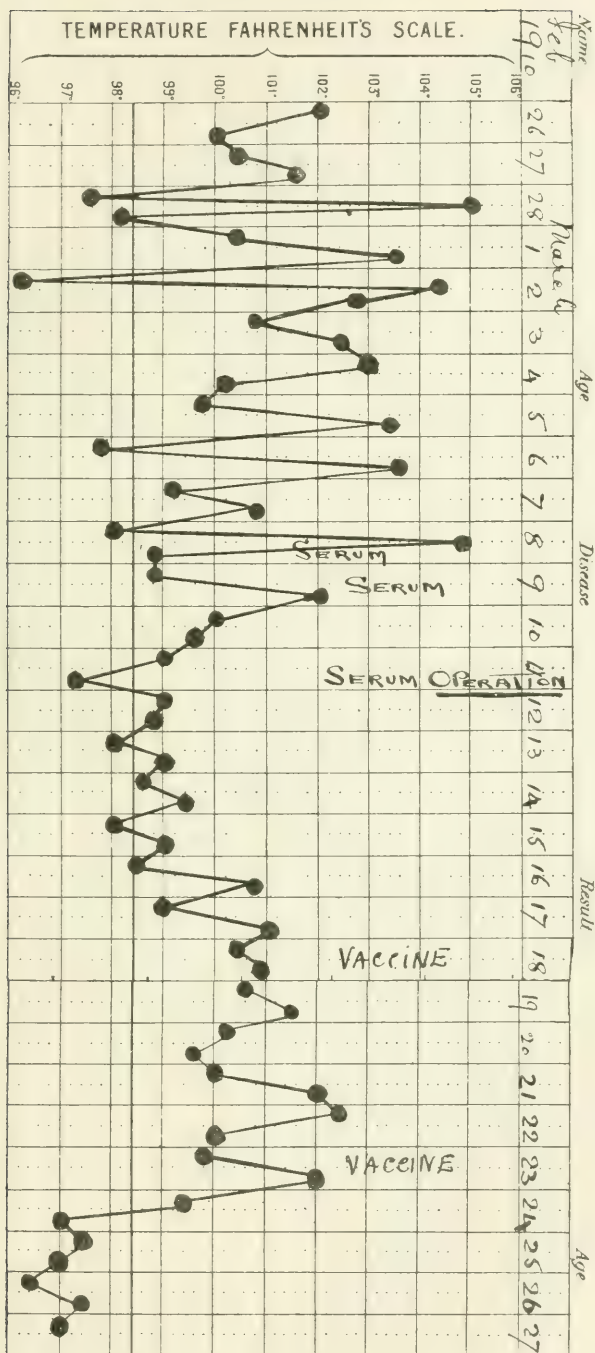
By J. S. FRASER, M.B., F.R.C.S.,

Assistant-Surgeon, Ear and Throat Department, Royal Infirmary, Edinburgh.

MRS. D., aged 41, had suffered from chronic middle ear suppuration on the left side for many years. Three weeks before admission to the Ear and Throat Department she had a shivering attack and complained of cough. The case was regarded as one of influenza, and was treated with antipyretics. The attacks of shivering with raised temperature became frequent—one attack, on 2nd March 1910, lasted three minutes, and the temperature reached 104° F. Four days later the left tonsil became enlarged, and on the following day the left side of the neck was painful. A blood count at this time showed a leucocytosis of 11,200, mainly due to an increase in the polymorphs. A rectal injection of 10 c.c. of antistreptococcus serum was given. Two days later, on the 8th of March 1910, there was a copious discharge of pus from the left ear, the flow of pus being greatly increased by pressure over the left side of the neck: antistreptococcus serum was again administered. The patient was seen for the first time by Dr. Logan Turner on 11th March, and was at once admitted to Ward 38. As Dr. Turner had to leave Edinburgh soon after seeing the patient, the operation was entrusted to the present writer.

Operation.—11th March 1910.—Ether anaesthesia.—On removing the bandages pus streamed out of the left auditory meatus. The left internal jugular vein was ligatured just above the clavicle; the vein was difficult to recognise as the walls were red, thickened and softened. On tightening the lower ligature the vein tore through, and some pus escaped, but no blood. There was also no hæmorrhage from the upper end of the vein which was left open to act as a drain. The lining of the internal jugular vein appeared to be greyish-yellow and sloughy. The radical mastoid operation was next quickly performed on the left side. The tympanic cavity contained foul-smelling pus. The sigmoid sinus was opened and found to contain fluid blood. The wounds were not closed, and the meatal flap was not cut. Duration of operation was fifty-five minutes. The pulse was very feeble at the end of the operation. The pus from the jugular vein contained chiefly a bacillus of the "coli" group and a few "diphtheroid" bacilli. A culture from the patient's blood was negative.

Progress.—The neck wound remained very sloughy for five days, and a little pus continued to come from the upper end of the vein. The ear wound showed no reaction. There was no return of the rigors, but the temperature continued to be elevated for twelve days



after operation (see Chart). The patient was very weak, but took her food well. There were never any signs of pleurisy or pneumonia.

The swelling of the left tonsil gradually subsided. Injections of *B. coli* vaccine were given on the 18th and 23rd March, and were, on each occasion, followed by a rise of temperature. Eleven days after the operation both wounds were granulating well. The neck wound was healed by the 5th of April.

Second Operation.—21st April 1910.—A plastic flap was cut from the skin lining the external auditory meatus and the mastoid incision was closed. The wound healed by first intention. All packing of the enlarged middle ear spaces was discontinued on 1st May, and at the present time the patient can hear whispered speech at 6 feet with the left ear.

Remarks.—The case illustrates the importance of examination of the ears in all cases of rise of temperature of unknown origin, especially when accompanied by rigors. The inner ear was healthy, as shown by the present state of the hearing, and the infection spread through the floor of the tympanic cavity to the jugular bulb, and thus gave rise to septic thrombosis in the bulb and jugular vein. The fact that pressure over the vein in the neck caused pus to flow out of the external auditory meatus shows that there must have been a gap in the roof of the jugular bulb and in the floor of the tympanic cavity. Finally, the case illustrates the power possessed by the tissues of overcoming severe infections. There can be no doubt that the jugular vein contained pus at a point lower than that reached at operation, and beyond this, again, there must have been an infected and then a healthy clot. Had this not been the case there would, of course, have been hæmorrhage when the ligature tore through the softened wall of the vessel. It is impossible in the present case to form an opinion as to the effect of the injections of antistreptococcus serum and of *B. coli* vaccine.

OBITUARY.

CLAUDE MUIRHEAD, M.D., F.R.C.P.

MANY noteworthy members of the medical profession in Edinburgh have recently passed to the Great Beyond, but it is safe to say that no one will be more missed or more greatly regretted by a wide circle of his brethren and friends than the subject of our present notice, whose last summons came on the 22nd of June in the seventy-fifth year of his age. He was found dead in bed in the morning, having retired to rest on the previous night in his usual good spirits and without showing any evidence of even slight illness. Surely a merciful crossing of the bar,



CLAUD MUIRHEAD, M.D.

such as is vouchsafed to comparatively few, and what he himself certainly would most have desired.

It is not easy to convey a just estimate of Dr. Muirhead's professional life and work. He was the most modest and unassuming of men, and withal a man of strong character, strong convictions, and of the most genuine and transparent straightforwardness.

He was a native of Edinburgh, his father being a prominent citizen and proprietor of the *Edinburgh Advertiser*. Young Muirhead was educated at the Edinburgh Academy, where he was in Mr. Trotter's class. He went first to the Academy in October 1846, and was thus one year under the headmastership of Archdeacon Williams, who was succeeded by the Rev. Dr. Hanna. His great friend at school and throughout life was Mr. Tom Steuart, afterwards Secretary to the British Linen Bank, who died a few years ago. At school Muirhead was known as "Hercules" owing to his great physical development for his age. On leaving the Academy he went to Edinburgh University with the intention of entering the Church, but after studying some years he abandoned Divinity and decided to devote himself to Medicine. He therefore brought a trained and reverent mind as well as great enthusiasm to bear on the profession of his choice. Whatever the Church may have lost, his subsequent career amply justified his final decision.

He graduated in 1862, and after studying in Vienna, Berlin, and Paris, he settled down in Edinburgh. He was particularly fortunate in being associated in his early professional life with such physicians as Dr. Warburton Begbie and Sir Douglas Maclagan, two men who undoubtedly impressed their strong individualities upon the rising young doctor. In the writer's opinion Muirhead's personality seemed in many ways a living reminder of the revered Sir Douglas Maclagan, and what higher meed of praise could be given to any man! Yet surely Muirhead was worthy of it. He was early appointed as Resident Assistant Physician (his colleague being Professor Sir Thomas Fraser) to the old Royal Infirmary, and he there acquired large experience in the fever wards during the many epidemics which occurred in those days, seeing much of smallpox, typhus, and relapsing fevers, which stood him in good stead in after life. Four years thereafter, in November 1869, he was appointed Senior Assistant Physician to the Royal Infirmary; in 1876 he was appointed Full Ordinary Physician, becoming Senior in April 1882, and he retired in 1891, when he became Consulting Physician to the institution. For ten years he was on the Board of Managers of the Infirmary—from 1893 till 1902—five years as a representative of the Royal College of Physicians, and five years as a representative of the Court of Contributors.

As a physician and clinician Dr. Muirhead was unsurpassed in his day. He was equally appreciated in hospital and in private. His

many patients adored him, as well they might. He was an accurate observer, his powers of diagnosis were great, and every diagnosis was arrived at after a logical and systematic survey of the case, which made his clinical teaching a model of what such teaching should be. But, in addition to his powers of diagnosis, his special interest in therapeutics made his treatment no haphazard affair. Every prescription was carefully and precisely thought out, and adapted to the special indications of each case. He was at his best and in his element at the bedside, and he had the happy gift of inspiring confidence, not only in patients, but in their medical attendants as well.

He spared no trouble, was unwearied in his ministrations, was always cheerful and reassuring, leaving his patients with a feeling of hopefulness and satisfaction, which made his next visits eagerly looked forward to.

Many a patient has cause to remember not only his medical skill and advice, so freely and generously bestowed, but also much material assistance in times of sore need, given with such tactful and kindly delicacy that even the most sensitive and independent natures could not but gratefully accept it in the spirit in which it was offered.

It was characteristic of the man that all was done quietly and unostentatiously, and it could truly be said that his left hand knew not what his right hand did.

As Physician and Clinical Lecturer on Medicine in the Royal Infirmary, Physician to the Chalmers Hospital, and Physician to the Fever Hospital, he gave his time and skill ever ungrudgingly and freely, and no "chief" was more revered and respected by residents and pupils than he. Many such will remember the kindly counsel and assistance which he was always ready to grant when asked, the cheering smile and friendly grasp of the hand so willingly given for help and encouragement at all times. He thoroughly understood young men, and they were always sure of his sympathetic comprehension in their difficulties.

He was for many years principal Medical Officer to the Scottish Widows' Fund Assurance Company, and was most painstaking and conscientious in the performance of his insurance duties. He was recognised as one of the first authorities on life assurance, and his publication on the *Causes of Death among the Assured from 1874 to 1894* is a very valuable contribution to the subject.

Dr. Muirhead was not a prolific writer, but what he did write was of great practical value, and he had the faculty of stating his views with remarkable conciseness and clearness.

It was characteristic of the modest and retiring nature of the man that he twice refused the presidency of the Royal College of Physicians—a position he was well fitted to adorn. He was on the Council of the College for thirteen years, and was one of its trustees at the time of his death.

He was the most hospitable of men, and few things gave him greater pleasure than to see round his friendly board large gatherings of his students and residents who, under his genial guidance, ventilated and discussed the "long, long thoughts of youth," both grave and gay. None who participated in such a privilege can ever forget it. A member of the Established Church, he was connected with St. Stephen's all his life under the ministrations of the Rev. Drs. Muir, Nicholson, Norman Macleod, and Grant successively, and no more generous or loyal member of the church could be found.

Dr. Muirhead married in 1873 the only daughter of Thomas Jameson Torrie, advocate. His wife died a year thereafter, and he lost his child in the following year. His whole life was saddened in consequence, and he threw himself with still greater energy into the work of his profession.

He had few recreations or amusements, and, with the exception of an annual visit to Wiesbaden and an occasional orchestral concert (for he was fond of music), he found all his pleasure in his work and in ministering to others. So has gone from our midst a splendid type of all that is best in the profession—an accomplished, dignified, and gentle physician, a true friend and a Christian gentleman.

J. H. F.

MEETINGS OF SOCIETIES.

Edinburgh Medico-Chirurgical Society.

A CLINICAL meeting was held in the Royal Infirmary on 25th May, Dr. Byrom Bramwell, President, in the chair.

Dr. J. S. Fraser showed a case of chronic suppurative otitis media complicated by septic thrombosis of jugular bulb and internal jugular vein. After ligature of the vein and a radical mastoid operation, there had been a satisfactory recovery, with good hearing in the affected ear.

Dr. Fraser also showed a patient after Killoan's operation for the cure of chronic suppuration in the frontal sinus. The cosmetic result was very good.

Dr. Dawson Turner showed a case of rodent ulcer, a case of nævus, and a case of enlarged cervical glands, all treated by radium and showing improvement.

Dr. Cranston Low (for Dr. Norman Walker) showed a case of generalised lupus erythematosus and a case of "port-wine" nævus under treatment by CO₂ snow.

Dr. George Mackay showed a case of spring catarrh under treatment by radium.

Dr. Gulland showed two cases of leucocythæmia in women. Both were of the myelocytic type and both showed comparatively low leucocyte counts when first seen. In one case, after influenza, the white cells fell to 29,000, then rose to 129,000, then under treatment by X-rays and arsenic had again fallen to 60,000 per c.mm. The other case presented a blood picture of pernicious anæmia at first. The white cells numbered 10,000. The anæmia and the general health had improved, but the leucocytes had risen to 72,000. There was a possibility that this case was a very chronic example of leukanæmia.

Dr. R. W. Philip showed a young woman illustrating the treatment of diabetes mellitus with massive doses of saline. Patient had been passing some 35 grs. of sugar per ounce of urine, and acetone and diacetic acid had been present. No benefit followed the use of dietetic treatment and codein nor ordinary alkaline treatment. Remarkable improvement followed the massive saline treatment. The essential element in the treatment was the large doses. Sulphate of soda had been given in the form of Hunyadi Janos. The patient had drunk a whole bottle in the course of one hour. The next day the diet consisted of milk diluted with five parts of water, and then the saline dose was repeated. The sugar fell to 5 grs. per ounce. It increased again, but the acidosis had never returned. After subsequent courses of the treatment the sugar had fallen to 5 to 10 grs. per ounce, and the patient had gained a stone in weight.

Dr. Alexander Bruce showed a case of bilateral paralysis of the spinal-accessory nerve after operation for enlarged cervical glands, and a case of injury to the spinal cord associated with ischæmic paralysis of one arm. Dr. Bruce also showed (with Mr. Cotterill) a girl, aged 13, suffering from internal hydrocephalus. Skiagrams showed separation of the bones of the skull.

Dr. Byrom Bramwell showed a case of intermittent claudication and gangrene of the right foot. Amputation had become necessary, due to obliterative arteritis. The patient had symptoms of cardiac failure. His red corpuscles numbered eight millions per c.mm. The obliterative process appeared to be commencing in the left foot.

Professor Caird showed a patient after removal of 277 enchondromata from the hip joint, a patient after removal of the scapula for sarcoma, and a patient after appendicostomy for colitis. The latter patient had suffered from diarrhoea and incontinence of feces. Since the operation a pint of 1 per cent. protargol had been injected through the fistula in the appendix every day and the symptoms had practically disappeared. Other antiseptics had been tried, but their effects were not so good as those of the protargol.

Professor Caird also showed a series of cases after removal of half of the tongue and of lymphatic glands for epithelioma. The operations had been done under cocaine and adrenalin. Prognosis was not good.

Eleven comparatively recent cases were shown, but Professor Caird had failed to secure the attendance of a single case operated upon at a more remote period than three years.

Mr. Cotterill showed a case of arterio-venous aneurism involving facial and ophthalmic vessels cured by ligature of the common carotid artery, and two cases with very marked improvement after decompression for cerebral tumour.

Professor Alexis Thomson showed a patient in whom, after the demonstration of a calculus in the ureter by the X-rays, this was removed by transperitoneal ureterotomy; a series of patients after facio-hypoglossal anastomosis for facial paralysis, due to fracture of the base of the skull; and a patient after complete extirpation of a large pancreatic cyst.

Mr. Cathcart showed a patient illustrating the results of irritation confined to the mucous membrane of the vermiform appendix. The chief symptom complained of had been pain in the back. The diagnosis had been made on the ground of slight tenderness. The appendix looked healthy outside, but it contained a concretion and some purulent fluid.

Mr. Cathcart also showed a little boy who had been cured of a faecal fistula following intussusception by operation, and a case of recovery after very severe cut-throat. The cut had extended down to the vertebral column above the hyoid, but had missed the main vessels. The tissues had fallen back, and there was now only a small opening about the size of a sixpence at the back of the throat which led to the trachea and œsophagus, and the patient had to feed himself with a tube.

Mr. J. W. Struthers (for Mr. Hodsdon) showed a patient after removal of a spindle-celled sarcoma from the brain $2\frac{1}{2}$ years ago.

Mr. Wallace showed a girl, aged $5\frac{1}{2}$ years, after nephrectomy for a very large sarcoma of the suprarenal capsule, and a man after removal of the cæcum for endothelioma.

Mr. Miles showed a boy, aged 10, suffering from acute osteomyelitis of the spine, and a man on whom cardiac massage was successfully performed for cardiac arrest during anæsthesia. Gastro-enterostomy had been performed for duodenal ulcer. During the course of the operation the abdominal muscles had never been satisfactorily relaxed, but just before the abdomen had been completely sutured the muscles suddenly relaxed and the pupils became widely dilated, and no pulse could be felt. The table was tilted, the abdominal sutures were cut, and the heart, which felt like liver, was grasped with the right hand. Massage was carried out between the hands, the left hand being outside. After a few preliminary tremors the heart resumed beating and the patient did well.

Mr. George Chiene showed a man, aged 52, with osteomyelitis

of forty years' duration, and a curious condition of the patellar tendon, which was so slack that a finger could be passed below it for some distance, and the patient had to initiate extension of the leg by giving it a swing with his hand. An abscess containing sterile pus was found in the bone at the most tender point.

A MEETING was held on 1st June, Dr. C. W. MacGillivray, Vice-President, in the chair.

Dr. Boyd introduced a discussion on "The Artificially Prepared Hypnotics, Their Use and Possible Abuse," a full report of which appears on page 7.

Dr. Norman Walker read a paper on the "Treatment of Lupus Carcinoma," which will appear in a future number of the *Journal*.

Dr. William Russell read a paper on the "Cambridge Reaction in Abdominal Disease." The test had been carried out in a large variety of cases, and the results had not been uniform. In a group of acute conditions the reaction had been positive in one case of acute necrotic pancreatitis, but it was also positive in a case of cancer of the stomach with infiltration of the liver, while the pancreas was healthy. The reaction was positive in a series of cases of gall-stones, cirrhosis, and catarrh of the ducts of the liver. In a group where the symptoms were gastro-intestinal, there were 26 positive and 29 negative results. Seven observations on members of the Royal Infirmary staff who appeared to be healthy gave 6 positive and 1 negative result. These results were not in favour of the reaction being specially associated with disease of the pancreas. The pentose which gave the reaction was probably an index of carbohydrate digestion in the intestine, and no more incriminated the pancreas than the presence and variations of urea, uric acid, and ethereal sulphates in the urine.

Dr. Chalmers Watson said his results tallied with Dr. Russell's, but he did not regard the test as a sign of pancreatic disease, but an indication that the intestine had reached the limit of carbohydrate digestion. In this sense the test was an aid to diagnosis and treatment.

RECENT LITERATURE.

CRITICAL SUMMARIES AND ABSTRACTS.

MEDICINE.

By J. S. FOWLER, M.D., F.R.C.P.,
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CANCER REACTIONS.

EFFORTS are being made along a number of different lines to discover some blood reaction which will assist in the diagnosis of malignant disease in cases in which ordinary clinical methods fail. The chief of these newer methods is the antitryptic reaction of Brieger and Trebing, but, in addition, attempts have been made to utilise the hæmolytic property of the blood serum of cancer patients, and, these proving unsuccessful, a cutaneous reaction with normal blood-cells has been introduced. During this year another, this time physical, test has been suggested—the melostagmin reaction. None of these, with the possible exception of the antitrypsin reaction, has really got past the experimental stage, but a short review of the main points brought out so far may be of interest.

Antitryptic Reaction.—Weil (*Amer. Journ. Med. Sci.*, May 1910) gives an excellent account of the present state of knowledge concerning this reaction, which was described by Brieger and Trebing in 1908, and has since then been the subject of a large number of investigations. The claim originally made for the test—that it is exclusively characteristic of cancer—has not been upheld, for the reaction can be obtained under a variety of circumstances—after the onset of labour and in the puerperium, in Graves's disease, on the change from breast to artificial feeding, &c. It is, however, characteristic to this extent, that it is given by nearly all cancer patients, and in only a small proportion of cases of most other diseases. The antitrypsin reaction consists in a marked increase of the power of the blood serum to inhibit the proteolytic activity of a solution of trypsin.

Methods. Two are in common use—(a) *Brieger and Trebing's method.* Plates of coagulated serum are used as the medium of digestion. A constant quantity of the serum to be tested is added to increasing amounts of a standard solution of trypsin, and a loopful of each mixture is placed on the serum plate, which is then incubated for twenty-four hours at 55° C. By inspection of the plate it is then possible to determine how much trypsin can be totally inhibited. (b) *Gross and Fuld's method.*

Solution of casein is used as the medium of digestion, serum and trypsin as before being added to a series of test-tubes containing equal quantities of the casein. At the end of two hours the tubes are acidified, whereupon any casein remaining undigested is precipitated. The lowest amount of trypsin which induces complete digestion indicates the limits of the antitryptic power of the serum. Weil regards the second of these as the better method, by reason of its simplicity, rapidity, absence of opportunity for bacterial action, and sharper end point. Notwithstanding alleged objections, solutions of commercial trypsin appear to be sufficiently constant for use in this test. The results are stated in figures indicative of the numbers of cubic millimetres of trypsin solution inhibited, and are comparatively, not mathematically, accurate, for Weil has shown by another ("viscosity") method that a serum which inhibits 6 c.mm. is not actually twice as active as one which inhibits only 3 c.mm. Weil finds that the two methods give results which are practically interchangeable. An increase in the antitryptic index of the blood serum occurs in 95 per cent. of all cases of cancer. All observers give quite comparable results on this point, the figures ranging from 70 to 95 per cent. Increased antitryptic power is also present in chronic wasting diseases, including diabetes and severe anæmias; in chronic infections, such as tuberculosis; in acute infections—pneumonia, typhoid, sepsis, and rheumatism; and in Graves's disease. It is therefore not characteristic of new growth, nor of cachexia. Physiologically it is met with after the transition from pregnancy to labour and the puerperium, and also in infants where artificial feeding is substituted for breast feeding.

From a diagnostic point of view a raised antitryptic index is too common to be valuable as a specific test. Its absence, however, tells strongly against cancer. If it is present in the case of a neoplasm of doubtful character, tuberculosis being excluded, is in favour of malignancy. It is so constant in Graves's disease that it may be relied on in the detection of larval forms.

From the biological standpoint, many features of the reaction are obscure. The chemical nature of antitrypsin is not known; possibly it is a lipid, but this is doubtful. It is also uncertain whether it is a true immune body, or whether the possession of antitryptic power is merely an accidental property of the serum. Various substances—*e.g.* charcoal, egg albumen—act as antitryptic agents, and it has not been shown that the antitrypsin of serum is specific in its action *vis-à-vis* trypsin as compared with other ferments. In this respect it differs from an artificially-prepared antiferment. But although antitrypsin cannot be properly regarded as an antibody, it is reasonable to suppose that the serum containing it may have responded to a given stimulus by means of a protective mechanism (defensive against auto-digestion) which does not answer to the criteria characteristic of amboceptors and

antibodies. Theoretically, a trypsin ferment should be present in the serum, and, actually, this has been demonstrated. Such trypsin may arise from (1) pancreas; (2) polynuclear leucocytes (which contain trypsin); (3) other tissue cells; or (4) cancer cells (which contain proteolytic ferments; and arguments have been adduced in favour of each of these sources. It is suggested that in gastric carcinoma the pancreas is over-active and thus trypsin passes into the blood, but this, of course, fails as an explanation of the reaction in other diseases. In acute infections it has been shown that the antitryptic reaction is related to the presence of leucocytosis, which looks as though the trypsin were set free by the destruction of numbers of these cells. In Graves's disease, typhoid, diabetes, and chronic tuberculosis, in which there is no leucocytosis, the heightened metabolism associated with cellular disintegration has been made responsible for the trypsin. In cases of cancer the trypsin originates in the tumour cells. To sum up, the origin of the hypothetical trypsin, which is supposed to act as a stimulus for the production of antitrypsin, or, technically speaking, as antigen, is as yet undetermined. It may, conceivably, arise in the pancreas, or in the leucocytes, or in the tissue cells, or in the new growth, but actual evidence that it does so arise is at the present time an absolute necessity for the establishment of the theory.

Skin Reactions in Carcinoma from the Injection of Human Red Blood Corpuscles.—Elsbey, Neuhof, and Geist publish some work in this direction in the *Amer. Journ. Med. Sci.* for February 1910. The fact that extracts of malignant tumours are hæmolytic has led to the search for hæmolsins in the blood of cancer patients, which would enable a diagnosis to be made. It has been erroneously claimed that in the early stage of cancer the blood is hæmolytic, but this occurs in only about half the cases, and is also found in other diseases.

The writers conceived the idea of testing the hæmolytic power of the blood by introducing washed human corpuscles under the skin of the patient. Normally, such cells would be broken up and carried away; abnormally, they might be liquefied *in situ*, and give rise to a local reaction. *Technique.*—Blood is aspirated from a vein into a syringe containing a bead which defibrinates when the syringe is shaken. A 20 per cent. suspension of the thrice-washed corpuscles is used, and may be preserved in ice for 24 to 48 hours. Five minims of the suspension are introduced under, not into, the skin of the forearm. A positive reaction begins in about 5 hours, increasing in severity, until it is at a height in about 8 hours. It may begin as early as 2 or as late as 8 hours. When the reaction is at its maximum there is an irregularly-shaped, well-defined, reddish, tender, slightly raised area, from 2 to 5 cm. in diameter, with a white areola. The colour varies from brownish-red to maroon with a bluish tinge. It fades in from 6 to 10 hours and leaves an ecchymosis. Percutaneous inoculation gave

negative results. 684 injections were made on 432 patients, grouped as follows:—I. Cancer; II. Certainly non-cancerous; III. Probably cancerous; IV. Advanced or miliary cancer. The results are tabulated thus:—

		Positive.	Negative.	Doubtful.
I.	69 cases	62 (90%)	5 (7%)	2 (3%)
II.	325 „	15 (4.6%)	307 (94.3%)	3 (1.1%)
III.	9 „	7 (77.8%)	2 (22.2%)	...
IV.	11 „	...	11 (100%)	...

Meiostagmin Reaction (μείων, small; σταζω, a drop).—This reaction is one which is being worked out by Ascoli in the institute for special pathology of internal diseases in the University of Pavia, and as the principle involved is a new one, which may, if found trustworthy, prove of service in the study of other immunity reactions, a general résumé of the papers which have appeared (*Munch. med. Wochenschr.*, 11th January, 22nd February, 19th April, 24th May, 31st May, 1910) may be given. The object of the test is to determine by a new method whether a given antigen reacts with a serum. In the research in question the antigens used were derived from tubercle and typhoid bacilli, as well as cancerous material. The principle underlying the test is simple. Hitherto the finer physico-chemical methods of detecting interaction between an antigen and antibody have been neglected, and it occurred to Ascoli to investigate whether, when such an interaction occurs, the surface tension of the serum is affected. The surface tension was tested in the usual way, by Traube's stalagmometer, an instrument which measures the number of drops yielded by a given quantity of fluid in passing through a fine opening. If the surface tension is high, the drops are larger and fewer; if low, the reverse. Working first with typhoid and tubercle bacilli extracts—known antigens—it was found that admixture of these with serums of typhoid and tuberculous patients increased the number of drops, thus showing that the surmise that interaction of antibody and antigen causes an alteration of the surface tension was correct. Using extracts of cancerous material as antigen, a similar lowering of the surface tension of serum from cancer patients, but not of patients suffering from other diseases, was obtained. The same phenomenon was observed with extracts of ankylostoma and echinococcus in the serums of patients suffering from ankylostomiasis and hydatid disease.

SURGERY.

THE CHOICE OF OPERATION FOR NEPHROPEXY.

IN a short communication on this subject Casper (*Zentral. f. Chirurg.*, No. 23, 1910) states his belief that all the complicated methods recommended for fixing the kidney are unnecessary. Having had occasion to operate a number of times on kidneys which had been decapsulated, and having always found them firmly fixed to their surroundings, he states that a simple method for nephropexy based on this experience is the best. He exposes the kidney by the usual lumbar route, incises the capsule, strips it completely forward to the hilum and then removes it all except a flap of the lower and posterior portion. The kidney is then replaced and the flap of capsule stitched with catgut to the quadratus lumborum in such a way as to retain the kidney in its proper position. A strip of iodoform gauze is then packed below the lower pole of the kidney and the wound closed except for the opening necessary for the withdrawal of the gauze in from five to seven days after the operation. The catgut stitches serve to restrain the movements of the kidney till adhesions have formed between it and the adjoining structures. By the end of three weeks these are firm enough to allow of the patients getting up. Casper has done this operation twenty-nine times and is perfectly satisfied with the results.

J. W. STRUTHERS.

EXPOSURE OF THE BASE OF THE SKULL BY TEMPORARY RESECTION OF THE PALATE.

Hofmann (*Zentral. f. Chirurg.*, No. 24, 1910) has made use of a new method of resecting the palate which gives, he claims, very good access to the naso-pharynx. He first carries an incision across the palate at the level of the first bicuspid tooth and follows this by an incision at right angles to it along the right or left alveolar process and soft palate as far as the arcus palato-pharyngeus. The incision goes down to bone on the hard palate and completely through the soft palate. The hard palate is then divided by a chisel along the incision, an elevator inserted, and the flap of soft and hard palate turned down. This is, according to Hofmann, quite easy in practice, the nasal septum being easily dealt with. The resulting exposure of the naso-pharynx is very free, the flap is easily replaced and stitched in position, and heals well, leaving no unsightly scar or other defect.

J. W. STRUTHERS.

APPENDICULAR GASTRALGIA.

Paterson (*Trans. Roy. Soc. Med.*, Surgical Section, 1910) has operated on twenty-four such cases. In the majority of them operation

was undertaken for a supposed gastric or duodenal ulcer. He has found a prominent symptom of appendicular gastralgia to be epigastric pain, which radiates downwards to the right iliac fossa. In the large majority of cases the pain follows the ingestion of food. In many cases there are sour eructations, vomiting, and even hæmatemesis and melenæ. Out of the twenty-four cases he found that ten complained of sour eructations, and fifteen suffered from vomiting, and five vomited blood on one or more occasions. In one case, such as the last, he opened the stomach and found the whole mucosa studded with numberless bleeding points. He has seen exactly the same condition in a case of duodenal ulcer associated with hyperacidity, and is of opinion that in the majority of cases of duodenal ulcer the hæmorrhage comes not from the ulcer as is generally supposed, but from the mucous membrane of the stomach. A noteworthy feature of many cases of appendicular gastralgia is the occurrence of a periodic exacerbation of the symptoms.

In seventeen of the twenty-four cases Paterson made a complete chemical analysis of the stomach content. In two of the cases there was marked hyperchlorhydria. In six the free hydrochloric acid was normal in amount, and in nine it was absent or virtually so. These nine cases were clinically cases of chronic gastritis. As a general rule, the longer the duration of the symptoms the greater the degree of gastritis shown by gastric analysis. In sixteen of the cases in which the stomach was examined at the time of operation the duodenum was found to be markedly dilated, and in seven cases peristaltic waves were seen passing over the pylorus. The appendix, although not extensively diseased, usually showed slight alteration in its structure. In half of the cases concretions were found.

The evidences that the gastric symptoms were due to the appendicular disease were:—Firstly, the majority of the patients were cured by appendectomy. Of the twenty-four patients, seventeen have been free from symptoms since they were operated on. Three have been improved, and four were returned as “not cured.” The patients who were not benefited by operation were those who showed evidence of very chronic gastritis. Secondly, the improvement in the gastric content as shown by gastric analysis before and after appendectomy. Paterson has found that a transient hyperchlorhydria may follow removal of the appendix. This, however, is symptomless, and tends to prove that it is not the hyperchlorhydria which gives rise to the symptoms but the organic disease which is caused by the hyperchlorhydria. Thirdly, on re-examining his cases of appendectomy for acute appendicitis he has found many give a history of having suffered from bilious attacks.

The differential diagnosis of appendicular gastralgia from duodenal and gastric ulcer and gall-stones is especially difficult in the former case. In duodenal ulcer the patient is usually free from symptoms

between the attacks. In appendicular gastralgia the patient suffers even between the attacks from flatulence and discomfort after food. The radiation of the epigastric pain towards the lower part of the abdomen is highly suggestive of appendicular gastralgia. The existence of tenderness over the appendix is diagnostic in a doubtful case. In many cases of appendicular gastralgia the alteration of the gastric content is not commensurate with the severity and duration of the symptoms. It is of importance to remember that duodenal ulcer is far more common in men, while appendicular gastralgia appears more commonly in women.

The explanation of the gastric symptoms which arise from appendicular disease is not to be found, according to Paterson, in a protective spasm of the pylorus as Mayo suggests. He considers it is due to intestinal stasis, and the symptoms are toxic from this cause. From a study of the above-mentioned cases Paterson considers it of great importance in all operations for supposed gastric or duodenal ulcer to investigate the condition of the appendix.

HENRY WADE.

THE CLINICAL SIGNIFICANCE OF GASTRIC HYPERSECRETION AND ITS CONNECTION WITH LATENT DISEASE OF THE APPENDIX.

Soltau Fenwick (*Trans. Roy. Soc. Med.*, Surgical Section, 1910) considers chronic hypersecretion of the gastric juice as invariably due to organic disease of the stomach or of some other organ of the body. In the great majority of cases it is found to be associated with either ulcer of the stomach or duodenum, gall-stones, or disease of the appendix. From post-mortem evidence and from observations made at operations he was convinced up to the year 1907 that 88 per cent. of all cases of chronic gastric hypersecretion were associated with a demonstrable lesion of the digestive organs, while in the remaining 12 per cent. no lesion of the stomach could be detected. During the last two years he has had examined at the time of operation the appendix and the other important abdominal organs in 112 cases of chronic hypersecretion. In twenty-two of these disease of the appendix was the only lesion found, in twelve gall-stones, and in four cancer of the pylorus alone existed. The dependence of the hypersecretion upon these lesions was corroborated by the results of treatment. Removal of the gall-stones was followed by the subsidence of the secretory disorder. Appendectomy was, as a rule, ultimately attended by a similar result.

He considers that the hypersecretion is probably reflex in origin. The continuous flow of hyperacid gastric juice excites severe inflammation of the stomach, and is very liable to be followed by ulceration of that organ or of the duodenum. This ulceration is at first quite superficial in character, and is capable of producing hæmatemesis and

melena. A careful comparison of the features of the various cases would appear to indicate that each possesses certain general characteristics which are sufficiently distinctive to permit of a correct diagnosis being made in the majority of instances.

Appendicular hypersecretion is the mildest form of the complaint. It is intermittent in character over several years. Two types occur. When the appendix is ulcerated or is in a state of active irritation from the presence of a calculus, pain is a noticeable feature. Gastric analysis shows hypersecretion and hyperacidity and moderate food retention. When the appendix is thickened or adherent, the symptoms of gastric disorder are identical with those of chronic inflammation of the stomach. Subacidity with an absence of free hydrochloric acid is the rule. As a rule, no history of a former appendicitis can be obtained, but in many cases the patient ultimately, if untreated, develops a suppurative appendicitis.

The chief points in favour of biliary calculus as the cause of the gastric hypersecretion are: its greater frequency in women, the persistence and severity of acid regurgitations, and constant tenderness over the gall-bladder. Hypersecretion due to an actual ulcer in the vicinity of the pylorus is accompanied by various symptoms of the disorder in their most characteristic form. The "hunger pain" is intense, emesis occurs, emaciation sets in, and acute hypersecretion follows. Dilatation of the stomach is always evident. The stomach content contains a great increase of free hydrochloric acid.

HENRY WADE.

SURGERY OF THE THYMUS GLAND.

According to D'Elnitz (*La Presse Médicale*, 9th April 1910), the clinical signs of hypertrophy of the thymus gland vary in different cases. Sometimes death occurs without any warning, or dyspnoea and wheezing may be constant. Suffocative attacks are frequently superadded, or they may come on in a child who is apparently healthy between attacks. They occur mostly at night, and the difficulty in breathing is also more marked when the child is lying down. Spasm of the glottis and laryngeal stridor may also occur, but without the pyrexia and hoarseness which are present in laryngeal diphtheria. According to some authorities, congenital stridor is due to a hypertrophied thymus. The physical signs are: cyanosis of the face during the crises, and persistently in dyspnoic cases; abnormal tension of the fontanelle; engorgement of the superficial veins of the neck; projection of the manubrium sterni, and occasionally asymmetry of the two sides of the chest; sometimes a palpable tumour in the supra-sternal notch; sometimes relief of stridor by downward pressure in the notch; area of dulness below the clavicle; abnormal shadow

shown by X-rays. In a case reported by Weil, Péhu and Chalier (*Lyon Médical*, 10th April 1910) there was a visible tumour in the notch on each expiration.

Vean and Olivier (*La Presse Médicale*, 9th April 1910) report four cases of thymus hypertrophy, and discuss the procedure for the relief of symptoms. They consider that exothymopexy, in which the thymus is fixed up by stitching its capsule to the manubrium or the suprasternal fascia, is uncertain. Resection of the manubrium is unnecessary, except in malignant cases with adhesions to neighbouring organs. Subcapsular thymectomy is the only rational operation. In the living subject it is not difficult to draw the gland out of its bed, and so isolate it from the great veins and important nerves. As the capsule is adherent to these structures, and to the pleuræ and pericardium, extra-capsular removal of the gland is impossible. With regard to the technique, a general anæsthetic should be administered, no death having yet been reported from its use. A median vertical incision is made, extending half an inch below the suprasternal notch. The sterno-mastoids and sterno-thyroids are separated in the middle line, and the upper border of the manubrium carefully defined. The gland is seen rising up during expiration. The capsule is grasped and incised, and its loose connections with the gland separated. The left lobe usually rises higher than the right, and should be first removed. The application of a ligature to the pedicle of each lobe is unnecessary, as the hæmorrhage is slight. The sterno-thyroids are stitched together and the wound closed. The improvement in the symptoms may be immediate or gradual, and, as far as is known at present, no ill effects follow the removal of the gland. At the same time, it must be recognised that the enucleation is only partial; complete enucleation is apparently impossible. The death-rate from the operation is low.

D'Elnitz, Prat, and Boisseau report an instructive case of thymus hypertrophy (*Bull. de la Soc. de Pédiatrie de Paris*, March 1910). The right lobe was removed without any improvement in the symptoms, and tracheotomy was performed immediately after. Again there was no improvement, and the manubrium was resected. A fibrous cord running between the two clavicles and preventing the expansion of the subjacent organs was divided. The symptoms disappeared in two days, but death occurred from infection of the mediastinum. The failure of the enucleation was probably due to the leaving of the left lobe.

In the case reported by Weil, Péhu, and Chalier (*loc. cit.*) no anæsthetic was employed. As much of the gland as possible was removed, and the capsule was stitched to the wound to prevent it sinking into the thorax. The respiratory crises gradually diminished in frequency, but death occurred from sepsis. They consider that partial subperiosteal resection of the manubrium without thymectomy is the operation of choice.

JAMES LOCHHEAD.

PATHOLOGY AND CLINICAL SIGNIFICANCE OF STOMACH ULCER.

W. C. MacCarty records observations of the material examined macroscopically and in frozen sections within two minutes after removal from 216 resections of the stomach for ulcer, ulcer and carcinoma, or carcinoma, in the clinics of the brothers Mayo (*Surgery, Gynecology and Obstetrics*, May 1910). The material comprised 58 ulcers in which no malignant disease was subsequently found, 125 ulcer-cancers, and 33 cancers without any good evidence of ulcer. Many specimens showed in the margin islands of perverted epithelium—irregular gland structures, with irregular nuclei showing irregular mitosis—which must be considered malignant, as the same changes were found in more extensive carcinomata in which the diagnosis was certain. The rupture of the basement membrane and epithelial infiltration of the deeper tissues were later phenomena, and the diagnosis of malignancy should not be barred because they had not occurred. At the same time, the difficulty of differentiation between hyperplasia and malignant hyperplasia is fully recognised, but the author says: "We are beginning to have it strongly impressed upon us that hyperplasia is a forerunner of malignancy." If carcinomatous tissue is absent in the base of the ulcer, it is certain that the ulcer was the primary condition and the malignant change supervened. When carcinomatous tissue is present in the base, the carcinoma may be primary, and the ulceration secondary. Clinically, it is impossible to say that an ulcer is not malignant.

JAMES LOCHHEAD.

OBSTETRICS AND GYNECOLOGY.

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IS PUBIOTOMY A JUSTIFIABLE OPERATION?

Two years ago Whitridge Williams gave his experience of the operation of pubiotomy, based upon thirteen cases, and he now adds twelve more that he and his assistants have since operated on at the Johns Hopkins Hospital (*American Journal of Obstetrics*, May 1910). In this series of twenty-five cases there has been no maternal mortality, and twenty-two of the children were saved. With such a result, the author naturally answers the above question in the affirmative, but he lays down very definite indications for the performance of the operation, and does not grant that it comes into competition with ordinary Cæsarean section.

The class of case in which it has its field is the border-line case, where it is difficult or impossible to say whether labour can be completed naturally or not until the patient has been for some time in the second stage of labour. The types of contracted pelvis in his series of cases were: generally contracted rachitic, 14; generally contracted funnel, 3; generally contracted, 1; simple flat, 3; rachitic flat, 2; funnel, 2. In connection with this series of contracted pelvises it is interesting to note that in only 15 per cent. was the occiput anterior, and in 55 per cent. it was directed to the right side. If bad vaginal lacerations and injury to the sacro-iliac joints are to be avoided, the operation must not be done in any pelvis with a true conjugate of less than 7 cm. Lacerations can be prevented to a certain extent by extracting with the forceps in a more horizontal direction than usual.

Williams does not think that the operation is one for the general practitioner, as statistics have shown that the mortality in a series of cases by many operators is high, in comparison with that of a second series by operators who have performed the operation several times. In the former group the maternal mortality was 9.1 per cent. in a total of 664 operations performed by 142 men; in the latter group the mortality was only 1.82 per cent. in a total of 319 pubiotomies by 19 operators. Given an experienced operator, the maternal mortality should therefore not be more than 2 per cent. and the foetal 4 per cent. He always now does the operation by Döderlein's subcutaneous method. He allows the patient to be a considerable time in the second stage—sometimes as long as three hours and a half—before making the section of the bone, and always delivers immediately after, either by forceps or by turning. In that way Nature gets the chance of completing the labour naturally, and it is only when she fails that the operation is performed. In several cases he has placed the saw in position through the transverse incision, has then applied forceps, and only on failure to deliver with them has the pubes been divided. In one case, after laying the saw in this way, the child was delivered by forceps alone, and the patient was saved the operation.

In the healing of the bone, union takes place by fibrous tissue in the majority of cases, and in two-thirds there was permanent movement between the separated parts. This, however, does not interfere with locomotion, provided the sacro-iliac joints have not been injured by over-separation of the bones at the time of operation. Most of the author's patients were out of bed in three weeks, and no special retentive apparatus was used during convalescence.

It has been said that the operation results in a permanent enlargement of the pelvis, which may permit of natural delivery in subsequent labours, and it is interesting to have Williams's experience on this point. Permanent changes were noted in eleven cases, in some so slight as to be attributable to errors in pelvimetry. In eight, however,

there was a pronounced enlargement of the transverse diameter of the outlet varying from 1 to 2.5 cm. The increase in the diagonal conjugate was less marked, but in five instances it varied from 0.5 to 1.25 cm. It would thus appear that in one-third of Williams's cases there was a permanent enlargement of the pelvis, most marked in the transverse diameter of the outlet, indicating that the operation is likely to be of most benefit in funnel-shaped pelvises. In four of his fifteen patients, pregnant again after the operation, labour terminated spontaneously, and in two of these the children so born were heavier than those delivered by pubiotomy. In both these cases the pelvis was of the funnel type.

Pubiotomy is thus, in Williams's opinion, an operation for border-line cases, and to be used in preference to the induction of premature labour where there is a doubt as to the possibility of the passage of a full-time child. It is attended with a high puerperal morbidity—55 per cent. in his cases—and does not enter into competition with Cæsarean section in those cases which can be definitely recognised before labour as impossible of delivery by ordinary means. It is to be preferred to Cæsarean section in cases of moderate pelvic contraction where the patient is already in the second stage of labour, but must not be done if, through previous attempts at delivery, there is reason to suppose that the woman is already infected. In such a case craniotomy, even on the living child, is to be preferred.

INFLUENCE OF X-RAYS ON THE OVARIAN TISSUE.

It has been known for several years that exposure to X-rays cause sterility in both men and women. Halberstaedter some five years ago exposed the ovaries of rabbits to the rays, and was able to demonstrate a marked atrophy of the follicles. Reifferscheid (*Zent. f. Gyn.*, April 1910) has carried out a series of similar experiments on mice and one on a monkey, and has had the opportunity of examining the ovaries of a woman after seven X-ray exposures. In experimenting on the animals he exposed one side of the body only, so as to have the normal ovary for comparison. In all, he found that the exposed ovary was smaller than the protected one, and that degenerative changes, varying in degree according to the length of exposure and the time elapsing till the death of the animal, were present. The primordial follicles were first affected, the epithelium of the follicle first degenerating, and later the ovum. In some of the ovaries there was an entire destruction of the follicles, their place being taken by a layer of coagulation necrosis. In the deeper parts of the ovary the ova were in some cases still present, but lying free in the centre of the follicle, the epithelial lining of which was completely degenerated. There was also degeneration present in the connective tissue cells of the theca interna.

It is interesting that he has been able to demonstrate similar changes

in the human ovary as a result of exposure to the rays. The patient from whom he obtained the specimen was the subject of phthisis, and, being pregnant, had artificial abortion induced. With a view to sterilising her she had the Fallopian tubes cut, but before the operation had seven X-ray exposures, the first thirty-nine days, and the last eighteen days, before. One ovary was removed, and in it there were marked degenerative changes. The primitive follicles were destroyed and the epithelium of the ripening follicles degenerated. In addition, there were minute capillary hæmorrhages in the stroma, but whether these were the result of the rays, the author is unable to say. There is thus a very definite histological basis for the clinical fact already observed, that exposure to X-rays is an effective method of sterilisation, they apparently exerting a specific action in the special elements of the ovary.

THE CHLORIDE CONTENT OF THE BLOOD IN ECLAMPSIA.

Javal (*La Gynécologie*, March 1910) has examined the blood of ten eclamptic women with a view to determining the quantity of chloride present. In all cases he has found a marked increase, the quantity varying from 6·2 to 7·2 grms. per litre. He has controlled his results by observations on healthy pregnant and non-pregnant women, and states that 6·2 grms. per litre must be regarded as the very largest quantity that can be normally present. In all the eclampsia cases the quantity diminished after the fit. He does not regard the excessive chloride as the cause of eclampsia, but any marked excess in a pregnant woman is an indication of impending eclampsia, and may be recognised even before the appearance of albuminuria. The excess of chloride has the effect of altering the osmotic tension of the blood and leads to the accumulation of the special toxins which produce the fits.

CHLOROFORM IN THE TREATMENT OF ECLAMPSIA.

Ward (*American Journal of Obstetrics*, March 1910) sounds a timely warning as to the bad results which may follow the use of chloroform in cases of eclampsia. The one universal finding post-mortem in all cases of eclampsia is a pronounced pathological condition of the liver, varying in degree from a cloudy swelling to actual necrosis of the liver cells. Chloroform is a general poison, with a special action on the liver very like that produced by the toxins present in eclampsia, and any prolonged administration of the drug is bound to aggravate the liver lesion already present. The administration of chloroform to control the patient during the fits is unnecessary, as this can be equally well effected by such drugs as veratrum viride and morphia, or preferably scopolamine and morphia. For any operative interference such as *accouchement forcé* ether ought to be the anæsthetic used, as so far it has

not been shown to have any deleterious action on the liver. Its use in preference to chloroform may save many a bad case, as it has apparently resulted in a diminution of the mortality in the Sloane Maternity Hospital, from which the writer draws his cases.

GENERAL PERITONITIS FROM RUPTURE OF A PYOSALPINX.

Comparatively few cases of generalised peritonitis from rupture of a pyosalpinx have been recorded, a fact which at first sight appears strange. Lamouroux (*Arch. Général de Chir.*, January 1910), after a careful search through the literature, has collected seventy-eight cases, and from these as well as from two cases of his own draws certain conclusions. Experimentally, the tube can be easily ruptured by over-distension, and the reasons why it so seldom occurs in pyosalpinx are the comparatively slow accumulation of the pus and the thickening which takes place in the tube wall as a result of the inflammatory process. The rupture takes the form either of a longitudinal tear or of a punched-out perforation. The mortality is high. All the thirty-one cases not operated on died, and of the forty-seven in which the abdomen was opened only twenty-seven recovered. In most cases the diagnosis of the cause of the peritonitis is uncertain till the abdomen is opened. The accident is most liable to occur after traumatism and as the result of parturition. In other cases it has followed the drawing down of the uterus preliminary to curetting. In treating such cases it is not sufficient to drain, as the best results are got where the tubes are completely excised, and, if necessary, the uterus also.

PATHOLOGY.

By JAMES MILLER, M.D., F.R.C.P.,
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THE EFFECTIVENESS OF PHAGOCYTOSIS IN DESTROYING THE GERM.

THE phenomenon of phagocytosis first demonstrated by Metchnikoff is practically universally admitted to be part of the mechanism whereby the body destroys invading bacteria—part, therefore, of the process of immunisation. There are a few who regard it as a purely physical phenomenon, depending upon surface tension. It is true that if asked to substantiate the statement, most medical men would be rather at a loss. What evidence is there that the bacteria are killed or even weakened through ingestion by phagocytic cells?

There is, in the first instance, histological evidence in the loss of staining reaction in organisms in the interior of leucocytes. Metchnikoff considered that he had proved the matter when he demonstrated pale staining micro-organisms in the interior of phagocytes. But organisms

lose their staining reaction even outside cells—sometimes with great rapidity—without being actually destroyed. Histological evidence cannot be regarded as proof positive.

Recently the whole matter has been put to the test of experiment, and it must be admitted that the phagocyte as a defender of the body, as a factor therefore in the process of immunisation, comes rather badly out of it.

Before entering into the question of the results obtained by observers, it will be well to see in what ways it is possible to put the matter to the test of experiment.

There are two distinct ways in which one can carry out such investigations. One is by mixing separated leucocytes and bacteria outside the body, keeping them together at body temperature for varying periods, and then testing the number or the virulence of the bacteria still present at the end of the time, and comparing the results with those obtained by testing similarly an emulsion of bacteria which has not been mixed with leucocytes.

This is of course a method of experimentation, usually called “*in vitro*,” which is open to the objection that the conditions under which the phagocytes act must of necessity differ from the conditions obtaining within the body.

The other method, which is usually termed the “*in vivo*” method, consists in injecting organisms into, say, the peritoneal cavity, removing the fluid in the cavity from time to time, and subjecting that to tests regarding number and virulence of organisms. The objection to this method is that, although the conditions in which the leucocytes act are normal, there is bound to be a reduction in the number of bacteria, merely by their wandering or being carried into other parts of the body; altogether the conditions render exact estimation practically impossible. As the majority of observers have employed “*in vitro*” methods, it will be convenient to detail their technique and results in the first instance.

With regard to the source and method of obtaining the phagocytes, Baumgarten has used Wright's technique to separate the leucocytes, as for the opsonic test. Schneider and Weil and Toyosumi have used leucocytes obtained by injecting broth into the peritoneal cavity, the fluid removed twenty-four hours after injection of 50 c.c. broth being very rich in phagocytes. Werbitzki used aleurone grains suspended in broth to induce an exudate rich in leucocytes.

The method of ascertaining the number of organisms still alive after prolonged contact with phagocytes has usually been plating out in the case of such organisms as staphylococci and bacillus coli, animal inoculations in the case of the tubercle bacillus. An objection might be raised to the method of plating out as a test of the number of organisms still alive. A plate does not indicate the actual number of

organisms present in a given fluid but only the organisms more or less widely separated from one another, so that if clumps occur, as would be the case after phagocytes had ingested bacteria, these clumps would only show as single colonies, although perhaps consisting of six, eight, or more bacteria. As a matter of fact, this will be found in practice not to be a real objection.

Baumgarten (*Munch. med. Wochenschr.*, 1908, S. 1473) has investigated the question in the case of staphylococci, the tubercle bacillus, and the anthrax bacillus in the following way:—Emulsions of these organisms were mixed with, in the first place, serum from various sources—human, bovine, &c.; in the second place, with washed leucocytes; in the third place, with serum and leucocytes. In each case the leucocytes were obtained from the same source as the serum. To estimate the effect on the bacteria after incubation for a given period the mixture was plated out (in the case of staphylococci and *B. anthracis*)—inoculated into animals in the case of the tubercle bacillus. The results obtained were as follows:—There was sometimes a distinct bactericidal action exerted by the serum alone on emulsions of the organisms. In the mixture of bacterial emulsion and washed leucocytes there were never more bacteria destroyed than in the pure bacterial emulsion. In other words, the addition of leucocytes to an emulsion of these organisms had not the slightest influence in destroying germs. Not infrequently the bactericidal action of the serum was actually diminished when phagocytes were added to the mixture. That is to say, when the bacteria had been opsonised and when phagocytosis could be proved to have taken place there was less destruction of germs than when serum alone was mixed with the organisms.

Werbitzki (*Archiv. f. Hygiene*, 1909, lxx. S. 270) obtained his leucocytes by injecting aleurone grains suspended in broth into the pleural cavity of the rabbit and withdrawing the exudate after twenty-four hours. He compared plates, made from mixture of bacteria (staphylococci, streptococci, and *B. anthracis*) with serum alone, and leucocytes alone with mixtures of bacteria, leucocytes and serum; in the latter case phagocytosis was proved to have occurred. The result was practically the same in every instance. The number of bacteria retaining the power to grow and multiply was the same whether the organisms were treated with serum alone, with leucocyte suspensions alone, or with a combination of serum and leucocytes. The same results were obtained whether the serum was ordinary serum or immune serum.

Tsuda has obtained similar results with guinea-pigs leucocytes, and anthrax bacilli (*Ibid.*, Bd. lxxi. S. 246).

Bartel and Neumann (*Centralbl. f. Bakt.*, 1906, Bd. xl. S. 723), working with exudate produced by the injection of aleurone, and tubercle bacilli, found no difference as regards virulence in organisms

brought into contact with the leucocytes and those not so treated, although films showed that phagocytosis had occurred. On the other hand, the same observers working with an emulsion of lymph glands found a loss of virulence in the bacilli treated with this emulsion, but only after a considerable period (twenty-two days) (*Ibid.*, S. 518).

The same observers also carried out "in vivo" experiments, injecting tubercle bacilli into the peritoneal cavity along with aleurone exudate, and testing the virulence of the organisms from time to time, with the result that the virulence was found undiminished when compared with organisms untreated.

So much for one side of the question. Other observers, working with the same organisms and with similar methods, have obtained quite other results. Rosenow (*Journ. of Infectious Diseases*, 1906, p. 683), working with pneumococci, found that the greater the amount of phagocytosis the more organisms were destroyed in mixtures of organisms, serum, and leucocytes. But the power to destroy bacteria disappeared when inactivated serum was substituted for active. Similarly Weil, Weil and Toyosumi, and Toyosumi (*Archiv. f. Hygiene*, Bd. lxx. and lxxi.), working with staphylococci, cholera bacilli, swine plague bacilli, &c., have found bactericidal action as a result of mixing organisms and leucocytes. As regards "in vivo" experiments, Bartel (*Probleme des Tuberkulosefrage*, 1909) infected rabbits by way of the intestinal tract and examined the lymph glands at varying periods thereafter and found that the bacilli in these glands showed a marked diminution in virulence.

How, then, are these conflicting observations to be co-related. Extracts from tissues rich in leucocytes such as spleen, lymph glands, &c., have long been regarded as capable of destroying bacteria. The substances which the leucocytes are supposed to give rise to have been named alexines by Buchner, cytases by Metchnikoff. From suspensions of polymorphs and mononuclear cells, by alternately freezing and thawing, by digestion with normal saline solution, more markedly by treating with X-rays, Schneider (*Archiv. f. Hygiene*, 1909, Bd. lxx. S. 40) has extracted substances bactericidal to typhoid bacilli. Similarly, Nunokawa (*Ibid.*, Bd. lxxi. S. 276) has obtained substances by freezing leucocytes of guinea-pigs, which either kill or inhibit the growth of the cholera vibrio.

Werbitzki, in another paper (*Ibid.*, Bd. lxx. S. 299), finds that under certain conditions, using aleurone exudate, particularly with certain organisms, notably bacillus paratyphoid, a bactericidal action was observed in the leucocyte suspension. From the above we may therefore conclude, in the words of Schneider, "There are bactericidal substances in the leucocytes (polymorphs) which are, not so much as a result of their destruction as owing to a vital secretory activity, set free on the application of certain stimuli in the test-tube just

as in the body." These "leukines," as he calls the antibacterial substances derived from leucocytes, differ from the antibacterial substances of the serum. Curiously enough, according to Schneider, similar substances cannot be extracted from mononuclear leucocytes.

One is therefore driven to conclude, what one might have imagined *a priori* to be the case—that *in vitro* experiments do not reproduce the conditions obtaining in the body. In other words, experiments, such as those of Baumgarten, are not conducted under conditions favourable to the action of bactericidal substances. What these conditions are, no experimental method yet introduced has shown, but that there are such substances in leucocytes available for the defence of the body there can be no doubt. An important practical point arises: Supposing the conditions of production are discovered, will leucocytes or extracts from them form useful therapeutic agents? Numerous attempts have already been made to induce a condition of leucocytosis in disease with a view to setting free bactericidal substances. Emulsions and extracts of leucocytes themselves have been used experimentally for example by Opi (*Journal of Experimental Medicine*, 1908, vol. x.), with some evidence of success in tuberculosis. But, as already indicated, until the conditions of production of this germ-destroying substance are understood, it is useless to talk of using leucocytes as therapeutic agents.

MEDICAL JURISPRUDENCE.

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SOME POINTS CONCERNING ARSENICAL POISONING.

CHRONIC arsenical poisoning from tapestry and wall-paper has long been recognised, although it has not been quite clear whether it was due to arsenic coming off in gaseous form or in dust. Zegers (*Dissertation*, Amsterdam, 1909) has attempted to clear up this point by keeping mice in an atmosphere over a potato culture of *Penicillium brevicaulis*, moistened with Fowler's solution, killing them after varying periods, and comparing the weight of arsenic in their bodies, and more particularly in their hair, skin, and paws, with the amounts in control animals. The results proved negative, and the author concludes that chronic arsenical poisoning from wall-paper, &c., is not due to gaseous arsenical compounds, but probably to arsenic-containing dust.

Marshall and Ryan (*Univ. of Penn. Med. Bulletin*, July 1909) have

investigated the point whether arsenic is given off in gaseous combinations when putrefactive changes occur in tissues derived from man or animals poisoned with arsenic. They find that there is no hydrogen arsenide evolved, nor yet arsenic in any gaseous organic combination, such as would be decomposed by strong sulphuric acid, so that it may be assumed that there is no loss of arsenic in the form of gaseous compounds when bodies of persons whose death was caused by arsenic are buried and undergo putrefactive changes.

Hutchinson (*Public Health*, January 1910) records another interesting small epidemic of arsenic poisoning in Manchester—this time in school children, from sweets containing arsenic. Sixty-two cases occurred; they had eaten on an average from 1 to 4 sweets. After about an hour, vomiting, abdominal pain, diarrhœa, and general malaise were complained of, but they all recovered completely on the same or on the next day. The sweets were found by Professor Délépine to contain on an average 13 parts of arsenic per 10,000, the largest having about $\frac{1}{20}$ th grain. Its mode of introduction into the sweets could not be detected.

THE DIAGNOSTIC VALUE OF BLOOD INVESTIGATION IN LEAD POISONING.

One very valuable sign of lead poisoning is the presence of basophile granules in the red blood corpuscles; these are readily demonstrated in alcohol-fixed films by brief staining with dilute methylene blue. But since these granules also occur in anæmic conditions and to some extent also in health, it becomes necessary to fix some limit to have a criterion. Schmidt (*Deut. med. Wochenschr.*, 1909, No. 46) fixes this at 100 granule-containing cells per million. This number can be found in an early stage of the disease when no other signs are present; but in severe cases, and also in those which are still latent, much larger numbers may be found. The author lays stress on this test for the recognition of "healthy lead-carriers," *i.e.* persons chemically poisoned with lead, but still showing no symptoms, so that the onset may be prevented. It is also valuable in distinguishing lead-hysterics, *i.e.* those who fancy themselves poisoned by lead, from those who are really ill. In doubtful cases it may be necessary to submit some 300 c.c. of blood to chemical examination.

FRACTURED BASE OF SKULL AND BRAIN INJURIES.

Longard (*Vierteljahrsschr. f. gericht. Med.*, Bd. xxxix. Heft 1, 1910) records an interesting case, which should be borne in mind when giving an opinion in injuries of this kind. A workman, 45 years of age, received a severe blow on the head; after a short period of shock he walked home—an hour's journey—perfectly conscious, but that night

he became unconscious and showed signs of marked brain irritation, taking the form at first of hallucinatory confusion, later of severe psychic and motor restlessness. He rapidly recovered, however, and about five weeks after the accident returned to his work, and was able to perform his heavy duties perfectly till his death, which occurred suddenly, with convulsions, one and a half years later. At the section there was found, as the result of an extensive fracture of the base, a mass of callus extending from the left posterior fossa over the petrous temporal bone, through the wing of the sphenoid and the ethmoid bones into the right anterior fossa. There were areas of slight superficial softening in the brain, and a gross destruction of the left frontal lobe, with numerous deeply extending areas of pulpy matter, some of them cystic and communicating with the lateral ventricle. The escape of the fluid from the latter was apparently the immediate cause of death. His complete capacity for work and seemingly normal mental condition after the first few weeks were remarkable in view of the ultimate findings. Neither his doctor nor his employer noticed anything as a result of the accident, and he himself made no claim for compensation, but it was ascertained subsequently that he had suffered from slight readiness to exhaustion, giddiness, intolerance of alcohol, irritability, and forgetfulness.

BIRTH INJURIES TO THE SOFT PARTS IN PREMATURE INFANTS.

The question of what amount of injuries to the soft parts of a child may be produced during normal labours is often a very important one in the investigation of suspicious cases of death in newly-born children. Lesser (*Vierteljahrsschr. f. gericht. Med.*, Bd. xxxix. Heft 1, S. 1 and 114, 1910) has had occasion to go into this matter in connection with an actual case of premature birth, and has reported some very important results. The body of a premature child was found under suspicious circumstances. It was 40 cm. (16 ins.) long, and weighed 1200 grm. (2 lbs. 10 ozs.); the lungs were about one-third expanded, the air passages clear; there was air in the stomach but not in the bowel. The injuries consisted of slight abrasions on the brow; large and small hæmorrhages in the skin of the shoulders, upper and fore arms and chest; small hæmorrhages in the skin of the back and back muscles, in the subcutaneous tissues of the thighs and left knee; also hæmorrhage in the muscles below the jaw and in both gums; marked suffusion of the skull coverings and temporal muscles and in the pia, but no subperiosteal hæmorrhages. The tissues were usually oedematous at the sites of the hæmorrhages. The mother only admitted that the child had fallen out of bed while she slept, but as this seemed quite insufficient to account for the multiple injuries, it became necessary to see whether such conditions could arise solely from injuries produced during the act of birth.

Investigation of 20 cases of spontaneous premature labours gave positive results in no less than 16. In 8 cases of head presentation there were numerous hæmorrhages in the skin, in the subcutaneous tissues, into the muscles, and subcutaneous œdema especially in the parts affected in the above-mentioned case; in 3 there were also hæmorrhages under the periosteum of the lower jaw. In 3 breech or foot cases there were similar appearances, but the presenting parts were usually free from injuries; one showed marked intra-muscular hæmorrhages (biceps, deltoid, pectoralis, &c.). In the remaining 5 the presentation was unknown. It is obvious, therefore, that even in perfectly normal births of premature children numerous and severe hæmorrhages may take place into the soft parts and give rise to suspicion of foul play. In one of the writer's cases the hæmorrhages were very severe, and similar to those resulting from suffocation. The epidermis was always intact, however—a condition which would not usually be present in death from violence.

SUFFOCATION BY MECHANICAL COMPRESSION OF THE EPIGASTRIUM.

Poujol and Salager (*Ann. d'Hyg. pub. et de Mèd. lég.*, April 1910) have been studying this mode of death by animal experimentation. It is one which is important medico-legally, not only because of its occurrence in deaths from compression during a panic, but because it might well be employed for murder. The authors find that death can be caused by a comparatively moderate degree of epigastric compression, and that it may be brought about as rapidly as by any other method of asphyxiation. Death is caused partly by compression of the heart, partly by asphyxia. The lesions in the respiratory system, when they are present, are identical with those met with in other forms of asphyxia. But the characteristic lesions are often entirely wanting in this mode of death, and if their absence coincides with absence of any sign of external violence, as may well happen, then it may be impossible to determine the cause of death. It is rather remarkable that in all their large number of experiments they never found any trace of pericardial hæmorrhages.

FINGER-PRINTS AND HEREDITY.

The author of this communication (*Arch. Psiq. y Criminol.*, Buenos Aires, 1909, p. 185) has examined the finger-prints of two families through four generations to see whether any common pattern ran through them. The results proved to be entirely negative. Even in twins the arrangements of the lines were widely divergent, and of the four children of a couple whose lines were by chance somewhat similar, only one had the same arrangement of the essential elements.

FAT EMBOLUS.

Fat embolus, which was first described by Zenker in 1862, and to which he probably attached too much importance as a factor in causing lesions, has gradually come to be thought of comparatively little importance, or only very rarely giving rise to dangerous symptoms. Bürger (*Vierteljahrschr. f. gericht. Med.*, 1910, Supplement) has re-examined this question and has come to some important conclusions with regard to fat embolus as a cause of death and disease. His material consisted of over 100 cases of death after injuries; in 50 where there were fractures of bone or there had been severe shock, fat emboli were found in the lungs of all save one, but only twice in other organs also. It appears to be a vital phenomenon, as he never found it in decomposing bodies (where death was due to some other condition), although a few other writers have described it as a post-mortem phenomenon. It may be simulated by the running together of the fat globules of the blood in conditions of lipæmia and after phosphorus poisoning. It occurs more abundantly in old people than in young, on account of the greater amount of fat in their bone marrow, and because of the more liquid condition of the fat (more oleic and less palmitic acid). The emboli may be found in the lungs of persons dying a few seconds after the fractures have been produced, and they have been recognised as long as 10 days afterwards. The results obtained with experimentally produced emboli from the injection of olive oil into the vessels are, in the author's opinion, in no way comparable to those produced naturally; they are too gross, and are distributed throughout the whole body. The severest cases of natural fat embolus may cause death, and three fatal cases are recorded in the paper. In one, death was due to blockage of the lung capillaries (respiratory form, rapid death, with asphyxial appearances), the lungs showing marked œdema, emphysema, and circumscribed hæmorrhages in addition to the emboli. In slighter degrees of pulmonary fat emboli the lungs may present a normal appearance. In the two other cases death may have been partly due also to fat emboli in other organs, especially in the brain, the long somnolence and death in coma pointing that way. With regard to severe but non-fatal cases, the author's conclusions are that fat embolus may aggravate an already existing emphysema of the lungs, and that it may permanently damage other organs such as the heart, kidneys, eyes, &c.; also that it possibly plays a part in the production of arterio-sclerosis and the traumatic neuroses coming on after severe injuries. The condition is therefore one of some importance from the point of view of both the clinician and the pathologist.

LIVER AND SUPRARENAL REACTIONS AS AN INDEX OF THE
SUDDENNESS OF DEATH.

The question whether death occurred suddenly or after a long agonal period is often of considerable importance, and cannot always be answered by an ordinary post-mortem examination. Lacassagne and Martin in 1899 put forward a test which they named "*Docimasia hepatica*," the essence of which was, that when death ensued after a prolonged period of agony the glycogen content of the liver diminished or entirely disappeared, whereas in cases of sudden death the liver gave a well-marked positive glycogen reaction. This test, however, cannot be regarded as a positive one. Meixner (*Vierteljahrschr. f. gericht. Med.*, 1910, Bd. xxxix. Supplement), from the investigation of a large number of cases, comes to the conclusion that many factors have to be taken into account. In sudden deaths, as a rule, glycogen is abundant, and is found only in the liver cells. The glycogen content of the liver may, however, rapidly disappear; one of the chief factors bringing this about is impoverishment of the still circulating blood in oxygen. With certain poisons, also, it rapidly disappears, and in all cases where it rapidly disappears from the liver cells it may be found in the blood-vessels and lymphatics.

Cevidalli and Leonecini (*Lo Sperimentale*, 1909, Pt. 5) have worked out a new method in connection with the suprarenal capsules which they term "*Docimasia suprarenalis*." An extract is made of the suprarenals with physiological salt solution; it is filtered and rendered acid. It is then tested with reagents such as iodine and chloride of iron. Several strong colour reactions are described. The most that they can say for their tests, however, is that a strong colour reaction points to sudden death, a weak one to slow death; so that we are no nearer an absolute settlement of this question.

NEW BOOKS AND NEW EDITIONS.

Traité International de Psychologie pathologique. Directeur : Dr. A. MARIE, de Villejuif. Comité de Rédaction : MM. les Professeurs BECHTEREW, de Saint-Petersbourg; CLOUSTON, d'Edimbourg; GRASSET, de Montpellier; LUGARO, de Modène; Dr. MAGNAN, de Paris; PILCZ, de Vienne; Professor RAYMOND, de Paris; ZIEHEN, de Berlin. Tome premier, *Psychopathologie générale*. 1 fort vol. grand in-8 de xii-1028 pages, avec 353 gravures dans le texte. FELIX ALCAN, éditeur. 25 fr.

THIS is the first instalment of a work that is to consist of three large volumes. It contains nineteen articles, grouped in ten chapters, by

various writers. The first chapter, by Professor Grasset, is upon the relations of psychiatry and neurology, but also considers the social applications of psychiatry. The next is a remarkably able and instructive article by Del Greco on the history of mental medicine. In the third chapter the editor contributes an essay upon psychiatric anthropology, in which he has been assisted by Dr. Pietkiewicz. There follows a section upon psychiatric electro-diagnostics and radio-diagnostics from the pen of Professor Mally. In Chapter V., Professor Mingazzini describes the sulci and convolutions of the brain of the insane. In the next the editor deals with the subject of the chemistry of the cerebral substance. Chapter VII. is a long article by A. Marie and Dide upon physio-pathological examination *par fonctions*, in which the relation of disorders of the various non-nervous organs to mental disturbances is discussed in great detail. Appended to this chapter there is an article by Levaditi on the syphilitic etiology of diseases of the brain. Chapter VIII. is upon general pathological anatomy in relation to mental medicine, and is divided into six sections, written by Klippel, Lugaro, Marinesco, Dide, Médéa, and Laignel-Lavastine. Professor Lugaro's article on the histological diagnosis of mental diseases and Professor Marinesco's on the arrangement and structure of the cells of the cerebral cortex are splendid expositions of their subjects, bearing throughout the stamp of the original observer. Maurice Dide treats of the lesions of the cord in the insane, Médéa of the alterations in the peripheral nerves, and Laignel-Lavastine of the pathological anatomy of the sympathetic and viscera. In Chapter IX., Professor Marro of Turin deals in masterly fashion with his old subject of human psychological development at puberty. The final chapter treats of the methods of examination, and is composed of four separate articles. The first of these is by Dr. Clouston, and deals with the clinical examination of the patient upon admission to the asylum. Professor Bechterew follows with an article on the objective psychological examination of insane patients. Professor Ferrari treats of the medico-psychological examination of defectives, and the volume ends with an exhaustive article on the examination of the criminal insane by Professor Carrara. The succeeding volumes are to deal with mental disorders in their clinical and psychological aspects, and with the principles of the care and treatment of the insane.

It is obvious that the promoters of this international treatise have set before them the high aim of producing the most complete and authoritative account of our knowledge of mental diseases that has yet been given to the world. If the inclusion of several articles that reach the high water-mark of scientific exposition can ensure attainment of this aim, then success has been complete, so far as this first volume is concerned. But more is certainly required. It is necessary

that this level should in some measure be maintained throughout the work, and also that the various articles should together constitute a complete and systematic account of the subject dealt with. It is especially in this last respect that the work lays itself open to criticism. The subjects with which this volume essentially deals are what may be called the institutes of mental medicine and the clinical examination of the patient who suffers from mental disorder, and that these are either completely or systematically treated it would be futile to maintain. The book is splendidly illustrated, but in regard to its typographical accuracy and consistency there is much room for adverse comment. At least seven of the articles, including those of Del Greco, Marinesco, Ferrari and Carrara, have one title in the text and another in the table of contents at the end of the book. The title "Chapitre IV." has been omitted in the text, the corresponding article appearing as a section of Chapter III., the page title of which is continued over it. The editorial summary of Professor Lugaro's article stops short at a point corresponding to the eighteenth page of the text (which extends to 82 pages), and therefore serves only to mislead the reader. In the heading of his article Dr. Clouston is both named and designated incorrectly, and in the text a fine English quotation is rendered ridiculous by mistakes in spelling. Errors of this nature are also far too frequent in the English and Italian references in the long bibliography appended to Chapter III. The want of an index detracts much from the usefulness of the book, but this defect will no doubt be remedied with the issue of the third volume.

Serums, Vaccines, and Toxines in Treatment and Diagnosis. By WILLIAM CECIL BOSANQUET, M.A., M.D.(Oxon.), F.R.C.P.(Lond.), and JOHN W. H. EYRE, M.D., M.S., F.R.S.(Edin.). Second Edition, thoroughly revised. Pp. 362. London: Cassell & Co., Ltd. 1909. Price 7s. 6d.

IN this second edition there is much new material dealing, for the most part, with the newer work of the last five years in the domain of so-called vaccine treatment, and in particular of tuberculin therapy. The book furnishes first of all a very clearly condensed and readable account of the fundamental facts and theories of the various forms of immunity to disease. It then goes on to describe the preparation and administration of serums and vaccines and their application in diagnosis. The rest of the book, and by far the larger part, deals with the individual infections and the immunising remedies devised for their treatment. In this section the practitioner would probably derive more benefit had the authors aimed less at historical completeness and given more space to summing up the practical outcome of the

various measures of immunisation and their personal experience or criticism of the same.

The term "toxine" is used somewhat more loosely throughout the book than is perhaps accurate, and the statement that the results obtained by vaccines depend on the activity of the intra-cellular toxins, and the quantity present, is hardly yet justified. The authors perpetuate the unfortunate confusion introduced by Wright of considering the strength of Koch's tuberculin R. as one-fifth of that stated by the makers.

The book, as a whole, provides a valuable summary of the present position in infectious diseases of specific treatment, which is now constantly claiming greater attention.

NOTES ON BOOKS.

IN *The Child: A Medical Guide to its Care and Management* (Charles Griffin & Co., Ltd.), Dr. Albert Westland discusses a wide range of nursery subjects, and gives sensible and trustworthy advice on most of the medical questions which the mother of a family is likely to be called upon to deal with. We have pleasure in recommending the book as well suited for its purpose. The only fault we have to find with it is the fondness the writer shows for long and technical words when short and common ones would have done just as well. This, along with the absence of illustrations, may possibly interfere with the large circulation which it certainly deserves.

In the second edition of Dr. Henry Jellett's well-known *Manual of Midwifery* (Baillière, Tindall & Cox, 1910) the various subjects have been brought thoroughly up to date, and many new illustrations added. The new sections dealing with vaginal Cæsarean section and pubiotomy are clearly written, and are accompanied by excellent diagrams showing the different stages of the operations. With scopolamine-morphine narcosis the author has apparently not had much experience, and devotes only a small space to its consideration. The grouping of acute yellow atrophy, hyperemesis, and eclampsia under the chapter on the Toxæmias of Pregnancy brings the treatment of these subjects into line with the latest conceptions regarding the etiology of these diseases. The book is one of the fullest and best of the manuals of midwifery in the English language, and one to which the practitioner can turn with the certainty of finding practical advice for every obstetric difficulty.

The second edition of *Medical Gynecology*, by Samuel Wyllis Bandler, M.D. (W. B. Saunders Co.), follows so soon on the first

edition that there are few alterations or additions in it. It must always be difficult to deal with a subject like gynecology from the purely medical side, and the author has evidently experienced this, for such subjects as curetting the uterus, the treatment of carcinoma, and of deciduoma malignum, all come under review. The purely medical aspects of the subject, such as the reflex neuroses and nervous conditions generally, are exceedingly well treated, but many of the methods of diagnosis described we do not approve of. For instance, in describing the method of vaginal examination, he states: "The index and middle fingers are in the vagina, the thumb is over the clitoris"—a position not the most comfortable for the patient. There are many illustrations showing the use of the tubular and bivalve speculum, but none to illustrate what, in our opinion, is the more generally useful one—that of Sims. Many of the illustrations are superfluous, and add to the bulk of an already large volume.

The volume on *Obstetrics* in "The Practical Medicine Series," edited by Joseph B. de Lee, A.M., M.D., and Herbert M. Stowe, M.D. (The Year-Book Publishers), gives a complete summary of all the important obstetrical literature for the past year, and, as showing the trend of modern obstetrics, it is interesting to note how much space is devoted to operative procedures. There are several papers on pubiotomy, notably one by Whitridge Williams, whose opinion is a favourable one, and others by operators who are not quite so enthusiastic. The latest modification of Cæsarean section, whereby the uterus is emptied extra-peritoneally, is adequately dealt with, as is also its bearing upon the treatment of bad cases of central placenta prævia. The literature on scopolamine-morphine narcosis has been extensive and is well summarised, and also that dealing with the treatment of eclampsia. There are several good illustrations, and these, combined with good type, make the volume easy to read. It is one which all who cannot find time to read the special journals, and yet wish to keep abreast of modern developments in obstetrics, ought to possess.

In the volume on *Gynecology*, of the same series, edited by Emilius C. Dudley, A.M., M.D., and C. von Bachellé, M.S., M.D., we have a concise and yet full summary of the literature on gynecology during the past year. While there is nothing startlingly new in any of the papers reviewed there are many of much interest. A special feature is the number of new operations for perineal repair and restoration of the pelvic floor described. Many of these are illustrated by excellent diagrams, which render the descriptions easy to follow. Altogether the editors are to be congratulated on compressing into such small space so much useful information, and at the same time avoiding a mere tabulation of facts.

Die Operative Geburtshilfe (Wiesbaden, J. F. Bergmann), by Professor Hermann Fehling, gives a good idea of the methods of operative midwifery now being followed in Germany. In some details these methods differ from those in use in this country, as is seen in the greater amount of space given to the consideration of pubiotomy ("pubiotomie" the author terms it) and the smaller space devoted to the description of axis traction forceps; but there are also many points of resemblance. The book is well illustrated (there are 77 figures), and the descriptions are concise. The last lecture closes with a warm recognition of the worth of Semmelweiss's work in puerperal fever.

Dr. Charles Blair's *Errors of Refraction and their Treatment* (John Wright & Sons) should be of use to students and practitioners who wish to learn something regarding refraction testing. The subject is treated from a very elementary standpoint, and the reader is not confronted with mathematical formulæ, or indeed with any problems likely to cause difficulty. The book may be recommended to those commencing work in an eye clinic.

In the preface to this, the third, edition of *Anæsthesia in Dental Surgery*, by Thomas D. Luke, M.D., F.R.C.S., and J. Stuart Ross, M.B., F.R.C.S. (Rebman, Ltd.), it is stated that, "Progress in anæsthetic methods and modifications of apparatus and technique have called for a revision of some parts of the text," but on comparing it with the previous edition we find very few changes, and these mainly in the chapter on Combinations of Nitrous Oxide. Relegated to the appendix, presumably to avoid renumbering the pages of this edition, is a short account of novocain. A list of gas and ethyl chloride anæsthetic cases has been added, also a short and sensible discussion of the recently proposed legislation on the administration of anæsthetics.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES AND NEWS.

Medical Education in the United States and Canada.

THOSE who are interested in medical education will find a perfect mine of information in Bulletin number 4, just published by the Carnegie Foundation for the Advancement of Teaching on "Medical Education in the United States and Canada." The report first discusses the larger questions of medical education from the general standpoint, and then, going on to particulars, deals, and deals most faithfully with each and all of the numerous schools in the States and Canada, criticising some of them with a candour which we may admire and envy, but, with the law of libel as it is in this country, can never imitate. We dare not quote all the names, but we take one or two examples.

(a) "The school occupies a badly-lighted building, containing nothing that can be dignified by the name of equipment." "The top floor is the 'hospital'; it contained two lonely patients."

(b) "The school occupies a building wretchedly dirty, excepting only the single laboratory devoted to pathology and bacteriology . . . there are no ward clinics. The superintendent is a layman who does not believe in admitting students to the wards. . . . There is a fair dispensary."

(c) "A dissecting-room, containing a few subjects as dry as leather. . . . There is a total absence of scientific activity. In hospital facilities the school depends largely on the county hospital, the management of which is political." Students merely "look on"; they are "not much at the bedside."

(d) "An ordinary ill-smelling dissecting-room and a single utterly wretched laboratory for pathology, bacteriology, and histology . . . no museum worthy of the name." "The laboratory sciences have been starved that small dividends might be paid to generally prosperous practitioners."

(e) "A wretched chemical laboratory and an ordinary dissecting-room. There is no outfit for physiology, pharmacology, or clinical microscopy, and no museum deserving of the name." Clinical facilities "entirely inadequate."

It is only fair to quote some of the favourable remarks:—

(f) "Good teaching laboratories in all necessary branches . . . in charge of enthusiastic teachers of modern training and ideals."

(g) "A complete series of admirable teaching laboratories . . . hospital organisation on sound lines."

(h) Of the Johns Hopkins—"the laboratory facilities are in every respect unexcelled. The hospital and dispensary provide practically ideal opportunities."

(i) Of the University of Toronto—"the laboratories are, in point of construction and equipment, among the best on the continent. Clinical facilities: the school has recently perfected a very intimate relationship with the new Toronto General Hospital, by which its faculty obtains complete control of the clinical advantages of some 500 beds."

The general section of the Report is probably the most important document that has yet appeared on the subject of medical education. Under the headings—The Proper Basis of Medical Education, The Actual Basis of Medical Education, The Course of Study (the Laboratory Branches, and the Hospital and Medical School), the Financial Aspects of Medical Education, &c.—we have the whole question discussed in a broad, thorough, and well-informed fashion that will greatly lighten the labours of medical reformers all over the world.

In the short time at our disposal we have only been able to skim the pages, but two things have impressed us in this summary review.

One is the frank recognition of the importance of clinical medicine. "The backbone of the structure is the clinic in internal medicine . . . the sufficiency of the school's clinical resources depends at bottom on its medical clinic . . . to sample a school on its clinical side, one makes, in the first place, straight for its medical clinic . . . there is no substitute for a good clinic in internal medicine. . . . A large surgical service with amphitheater operations every day in the week, a dispensary crowded with eye, ear, and throat cases—these are all very well in their way. But one comes back to the medical clinic, that is the really important item."

The other matter deals with the relation of the universities to the hospitals, and it crops up so frequently that it is evidently greatly exercising the minds of the reformers in the United States. With one or two outstanding exceptions, the relationship between the universities and the hospitals is of the vaguest possible description. Envious reference is made to the condition in Germany, in England, and in Scotland. The conditions in New York come in for special criticism, and indications are given how, "without sacrificing a jot of their local distinction, without limiting in the slightest degree their usefulness to the sick poor, the New York hospitals may—any or all of them—win a place as scientific laboratories beside Guy's and St. Bartholomew's, the Royal

Infirmary of Edinburgh, the Charité of Berlin, the Hôtel Dieu of Paris."

Everyone interested in medical education must read the book; and we venture to suggest to the Foundation that a fuller index would greatly add to the usefulness of the Report.

Scottish Universities' Grant.

PUBLIC announcement has just been made of the fact known for some time to the initiated that the Parliamentary Grant to the Universities has been increased by £40,000 a year. Edinburgh and Glasgow each receive £12,500, Aberdeen £9000, and St. Andrews £6000, of which £1500 is ear-marked for Dundee. The Departmental Committee puts forward numerous suggestions as to the expenditure of this money. One which we think will meet with universal approval is, that the salaries of the Principals—at present shamefully inadequate—should be raised, those of Edinburgh and Glasgow to £2000, and of Aberdeen and St. Andrews to £1500. Another is that the proper place for the medical school of St. Andrews is Dundee, and it is suggested that the Chair of Anatomy in St. Andrews should be converted into one of Comparative and Human Anatomy, including Embryology and Anthropology; and that of Physiology into one of Psychology, Experimental and Developmental.

The Committee have carefully discussed Dr. McCormick's suggestion of a composite fee, and commend it to the careful consideration of the Universities.

The question of the admission of women to the University Classes in Edinburgh has evidently been the subject of anxious consideration. The offer to provide for their instruction in special classes provided a special grant was made has not been accepted, and women students who are not satisfied with the existing arrangements in Edinburgh are recommended to go elsewhere.

We are glad to see that the Committee expresses approval of Professor Woodhead's suggestion that the fees for clinical instruction in Edinburgh should be raised. We do not think the great amount of work which the clinical physicians and surgeons do for a miserably small remuneration is generally recognised, or that it is realised that the student gets three or more years of highly technical training for about £40.

ON the invitation of the Medical Staff of the Royal Hospital for Sick Children a meeting was held on Monday, 18th July, for the discussion of the methods in practice for the care of the infant and young child (to five years) in Edinburgh. Through the courtesy of the Council of the Royal College of Physicians the meeting was held in the Hall of the College. It was attended by about sixty ladies and gentlemen connected with the various charities

and relief institutions in the city. After a free discussion the two following motions were unanimously adopted:—

1. "In the opinion of this meeting immediate benefit will be conferred on poor children in Edinburgh by closer co-operation of relief agencies, by stricter regulation of the milk supply, and by the development of special milk-depots under direct medical supervision."

2. "That to further these ends the following be asked to form a committee:—Dr. Williamson (Medical Officer of Health), Professor Lodge (Charity Organisation Society), Mr. James Clark (School Board), Dr. Leslie Mackenzie (Local Government Board), Professor Gerald Leighton (Royal Veterinary College), Mrs. Kerr (Social Union), Mrs. Somerville (Voluntary Health Visitors), Dr. Melville Dunlop (Royal Hospital for Sick Children), Dr. Dingwall-Fordyce, Honorary Secretary. That this committee have power to co-opt members, and that it be instructed to arrange for a meeting in the autumn of representatives of all relief agencies in the city relating to child life."

Conferences.

THE two conferences held in Edinburgh last month were both most successful. The National Tuberculosis Conference, ably managed by Dr. Philip and his assistants, attracted most public notice. Professor Osler's sermon in the McEwan Hall on Sunday, when "exercises" were conducted by other members of our profession, was an interesting novelty, and the visit to the new Farm Colony was greatly enjoyed.

The alienists met more quietly under the presidency of Dr. John Macpherson in the Royal College of Physicians, and under his able guidance discussed those matters in which they are specially interested. Their outing—at Craig House—was unfortunately interfered with by the weather. At the annual dinner of the Association very interesting speeches were made by Lords Salvesen and Guthrie, while Dr. Yellowlees showed that eloquence was not confined to the Law.

The American Society of Clinical Surgery.

TIME was when Edinburgh was the Mecca of the surgical pilgrim, and in the heyday of her glory, when Lister was still with us, visitors were drawn to our School from all quarters of the globe. The glamour of these great days has not yet faded, and we still have the pleasure, from time to time, of extending a welcome to our confrères from other schools at home and abroad. Within the last few months the Edinburgh School of Surgery has been honoured by visits from the Society of Provincial Surgeons, from several distinguished continental surgeons, including Professor August Bier, and from the American Society of Clinical Surgery, which includes in its membership the most distinguished surgeons of the United States, which has come to mean some of the most distinguished surgeons in the world.

The visit of this last Society took place on 6th July, when an interesting programme of surgical work was arranged in the Royal Infirmary and at the Royal Hospital for Sick Children, and in the evening the members were entertained to dinner by the Royal College of Surgeons in the new hall of the College. The toast of "The Guests" was proposed by the President (Mr. J. M. Cotterill), and responded to by Mr. G. W. Crile, of Cleveland, and Dr. E. Martin, of Philadelphia.

The membership of the Society, we understand, is limited to thirty-five, and no fewer than twenty-six members were present, namely:—Drs. S. Alexander (New York), G. E. Brewer (New York), Willard Bartlett, A. G. Bevan (Chicago), G. W. Crile (Cleveland), E. H. Codman (Boston), J. E. Clark (Philadelphia), G. G. Davis (Philadelphia), E. Elliott (New York), C. H. Frazier (Philadelphia), J. M. T. Finney (Baltimore), L. W. Hotchkiss (New York), J. H. Hutchinson (Philadelphia), M. L. Harris (Chicago), R. R. Harte (Philadelphia), R. G. Leconte (Philadelphia), F. B. Lund, E. Martin (Philadelphia), C. H. Mayo (Rochester), J. B. Murphy (Chicago), J. C. Munro (Boston), L. L. Macarthur (Chicago), C. A. Porter (Boston), C. H. Peck (New York), Emmet Rexford (San Francisco), G. W. Woolsey (New York).

When our American colleagues again honour us with a visit, and we sincerely trust it may be soon, we hope they will spare us more of their time, so that we may afford them a more satisfactory opportunity of becoming acquainted with the work of the Edinburgh School than was possible during their short stay last month, to which, however, we look back with the greatest pleasure.

**The late Capt.
E. D. Simson, I.M.S.**

WE hear with great regret of the death, from cholera, in India, of E. D. Simson. He graduated in 1906, and went straight into the I.M.S. He was a hard-working student, but it was especially his influence with his fellow-students that—along with his distinction in the football field—endeared him to his teachers. His life has been soon cut short, but it has not been lived in vain. There are not a few who are what they are to-day owing to the direct or indirect influence of "Kemo."

Appointments.

DR. HAMILTON MARR of Woodilee Asylum has been appointed a Commissioner in Lunacy for Scotland, in succession to Dr. John Fraser, who retires under the age limit.

Dr. Alexander Bruce has been appointed medical officer to the Scottish Widows' Fund, in succession to the late Dr. Muirhead.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH,
ROYAL COLLEGE OF SURGEONS OF EDINBURGH,
AND ROYAL FACULTY OF PHYSICIANS AND
SURGEONS OF GLASGOW.

The following candidates have passed the final examination and have been admitted L.R.C.P.E., L.R.C.S.E., and L.F.P.S.G.:— John James O'Grady, Adelaide; Alfred Ernest Tuglan, Belfast; Thomas Noel Usher, Nelson, New Zealand; Ian Ronalds Macleod, Scotland; Andrew Dawson Turnbull, Edinburgh; Henry Ernest King Fretz, West Indies; Robert Warrenne Dale Hewson, Cheadle; Richard Burrows Sephton, England; Howard Douglas Stewart, London; Charles Wallace Kay, Lucknow; Harold Gordon Chouler, Algoa Bay; Michael James O'Shea, Brisbane; Eustace Thorp, Belfast; Thomas Boston Johnstone, Edinburgh; Triloki Nath Sinha, India; and Vasudeo Dinkar Nimbkar, India; and 9 candidates passed in Medicine and Therapeutics, 3 in Surgery and Surgical Anatomy, 10 in Midwifery, and 13 in Medical Jurisprudence.

ON LOCAL ANÆSTHESIA, WITH SPECIAL REFERENCE
TO VEIN ANÆSTHESIA.¹

By PROFESSOR AUGUST BEIR, of Berlin.

SINCE the introduction of cocaine as an effective means for producing local anæsthesia, some twenty-six years have elapsed. During this period no efforts have been spared to develop the methods of local anæsthesia, but, in spite of all kinds of old and new methods having been tried to find some other useful and at the same time non-injurious method of inducing local surgical analgesia, cocaine and its substitutes, which pushing chemical manufacturers place in our hands, cannot be beaten. It is understood that these preparations, acting powerfully upon the nervous system, are dangerous poisons. We therefore had to pay dearly before we managed to produce effective local anæsthesia free from danger. The reputation of having been the first to solve the question in a satisfactory manner belongs to Schleich. Even admitting that other surgeons before him had invented methods of infiltration, and that, for instance, Reclus, who may be considered the senior originator in local anæsthesia, used 1 per cent. cocaine solution without dangerous complications, it was only after Schleich's discovery of infiltration by much diluted cocaine solutions that local anæsthesia became familiar to a wider circle of surgeons. His method really entails no danger, even in the hands of inexperienced persons. There are only a few surgeons now who have not used his method to advantage a great many times.

In all likelihood his method will never disappear in medicine. Yet other more effective methods, quite simple and inoffensive, now compete with it, and even surpass it in many respects.

Permit me to remind you of the essential features of Schleich's infiltration anæsthesia:—(1) By means of a fine needle the solution is infiltrated into the different layers of the tissue. Within the cutis the characteristic wheal of white colour appears, producing at once skin anæsthesia. Taking this as a starting-point, large parts can be infiltrated without pain to the patient. The deeper lying parts are treated in the same way. Anæsthesia

¹ Being the Cameron Lecture delivered before the University of Edinburgh, 20th July 1910.

will take place at once, because methodic infiltration within the tissue will bring the anæsthetic into contact with the nerve ends easily to be anæsthetised. (2) For these reasons a very weak cocaine solution will do, Schleich's normal solution having been 0·1 per cent. This enables the operator to use rather large quantities of the solution, the more so as the poisoning effect does not only depend upon the absolute quantity of poison, but also upon the concentration of the solution, the poisoning effect being in direct proportion to the concentration. The essential advantage of Schleich's infiltration anæsthesia consists in its causing no dangerous complications. Poisonous effects have never been noticed when his method was properly carried out. It is, besides, very convenient for the operator to commence operating as soon as the infiltration has been finished. But this method also has great drawbacks. The procedure is troublesome, and cannot be relied upon in cases where fine nerve branches cross the field of infiltration, as the weak cocaine solution is not able to anæsthetise these. We are now in possession of other methods as uninjurious as Schleich's, yet less complicated with regard to technical details, and much more effective.

There is no doubt about the principal credit regarding the development of the different methods of local anæsthesia belonging to Braun. In adding suprarenal preparations to the anæsthetising mediums, he was able to produce anæsthesia of an effectiveness and duration quite unknown hitherto, and by the same medium he taught us how to use large quantities of powerful solutions without injurious consequences. Another advantage is that suprarenal preparations permit of the performance of a good many operations without almost any disturbing presence of blood. As to their vaso-constricting power, they greatly surpass cocaine.

Braun also investigated, in a correct scientific way, all circumstances relating to local anæsthesia, thus developing our knowledge in this respect in a marked degree.

Chemical manufacturers have provided excellent substitutes for cocaine, which, although less dangerous, are quite able to produce effective anæsthesia. In the first place, I may mention novocaine, and furthermore alpine, eucaine B., and tropacocaine. It may be said without hesitation that nowadays cocaine ought not to be utilised as a surgical anæsthetic except in anæsthesia of a mucous membrane.

We also advise the practice of infiltration anæsthesia according

to Braun's method. In this case, too, the addition of suprarenal preparations is quite essential. It enables us to utilise large quantities of the anæsthetic without danger to the patient. It renders anæsthesia as effective as if it were made with the aid of the Esmarch bandage, without presenting, however, the inconveniences of the latter. It will, besides, warrant long duration of the anæsthesia. This obviates the necessity of a second infiltration for skin suturing after a long operation. As anæsthesia will considerably outlast the operation, the patient operated in the Policlinic will have the advantage of reaching his home before the wound pain will set in.

No dangerous effects upon the organism or the part to be operated upon will be caused by the addition of suprarenal preparations, provided they are added in proper proportion to the solution, and no deteriorated solutions are used. There is not even the danger of subsequent hæmorrhage, if one does not use too much of the drug, and if the operator sees to careful hæmostasis. Nor is there any danger of mortification of the infiltrated parts of the body.

We quite agree with Braun in recommending novocaine, in conjunction with suprarenal preparations, as the best medium we at present have for local anæsthesia. We always use Braun's isotonic solution to avoid irritation of the tissue. For the sake of simplicity, and in order not to keep too many different solutions, we also use for infiltration anæsthesia a novocaine solution of 0.5 per cent.

Much greater advantages will be derived from suprarenal preparations, when used in connection with other methods of producing local anæsthesia. In fact, most of them have been brought to practical value only by Braun's procedure. The most primitive method, which was used everywhere after the introduction of the surgical cocaine anæsthesia, namely, the simple subcutaneous injection, or, if the case required it, a deeper injection of the anæsthetic into or between the tissues, on account of its not being reliable when small doses of cocaine were used, and being dangerous with larger ones, was supplanted by infiltration anæsthesia. When suprarenal preparations are added, it can be used to advantage, provided the operator will wait a good while, until the anæsthetic has thoroughly penetrated the tissue, which will take about five to ten minutes. Of this primitive procedure, which is perfectly safe, we now make frequent use.

Waiting is quite essential to ensure success in anæsthetising work.
—Do not try to economise too much in applying the anæsthetic. From 80 to 120 c.cm. of 0·5 per cent. novocaine solution, plus suprarenin, may be injected into the body of an adult without danger.

A method which derived the greatest advantage from conductive anæsthesia produced by perineural injection in conjunction with suprarenal preparations is Hackenbruch's method of peripheral injection. You are, of course, well acquainted with this method. Let us take, as a typical example, the extirpation of a well-defined tumour. Starting from anæsthetic wheals of the skin, the subcutaneous cellular tissue is infiltrated at some distance from the tumour, the infiltration showing a rhomboid shape, after which a spherical cup-shaped injection is made round the tumour itself. Wait until the sensitive nerve branches, which, on account of the peripheral injection, have to come in contact with the anæsthetic, have lost their conductive power, and then the removal of the tumour can be carried out without causing pain to the patient.

Thanks to the addition of suprarenal preparations, peripheral injection has become quite an excellent and effective procedure. Also, in this case, the suprarenal preparations permit one to administer large quantities of rather powerful anæsthetics, ensuring long duration and great intensity of anæsthesia.

A further advantage of the procedure consists in its technical simplicity. The surgeon operating only on slight cases, and on cases of medium importance, has to bear in mind that in operations within the skin he will also have to paralyse, by infiltration of the subcutaneous cellular tissue, the sensory nerves coming from the deeper parts. If he does this, and if he has the necessary patience to wait, the procedure will scarcely be a failure.

We therefore make frequent use of this procedure, even in very important operations; for example, in total excision of the larynx, together with the lymphatic glands. In thyroidectomy, also, it has become our standard method, as being far more reliable than infiltration anæsthesia. The necessary moving of the goitre, too, which is said not to cause real pain, but only a sensation of pressure and anguish, is rendered less disagreeable to the patient, who very often does not find it troublesome at all.

In thyroidectomy we proceed as follows:—A peripheral injection, having the shape of a large square, is made on the skin round the field of operation, taking anæsthetic skin wheals as a starting-point. The needle is then brought laterally below the fascia, push-

ing it, without ceasing the injection, a little deeper along the border of the sterno-mastoid, in the direction of the large vessels, but without actually reaching them. Above and below, too, the needle is inserted under the fascia, and in cases of intra-thoracic goitre, injections are made behind the sternum. We finally inject below the isthmus.

There will be, of course, no regular peripheral injection posteriorly, as we have to bear in mind the large vessels, and in order to avoid them we cannot turn the point of the needle around the tumour behind.

But after a certain time of waiting and abundant injection—we take 60 to 80 c.cm. of 0·5 per cent. novocaine solution, plus suprarenin—the anæsthetic thoroughly penetrates the loose tissue surrounding the goitre. The hæmostatic action of Braun's solution is quite an agreeable feature in peripheral injection of the goitre.

Sometimes we notice paralysis of the recurrent laryngeal nerve during anæsthesia as a consequence of the injection. This proves the efficiency of the novocaine, which even intercepts motor conduction.

Patients who are not abnormally sensitive always affirm that this procedure almost excludes pain. It is understood that in cases in which the operator has to deal with exceptionally excited patients local anæsthesia will not do, and he will have to proceed to general anæsthesia.

Peripheral injection also proved very useful in the removal of other large tumours of the neck, provided they formed a compact mass. I have, for instance, performed the operation of total extirpation of the larynx, in connection with the curretting of the glands, without causing pain to the patient. For safety the mucous membrane was previously rendered insensitive by cocaine, plus suprarenin, to prevent coughing.

I desire to state here that we were still more successful in total than in partial extirpations.

The secret of successful anæsthesia in such important operations is waiting, besides using a sufficiently large quantity of the solution. As a rule we did not start operating before fifteen minutes after the injection, although we must admit that waiting is an irksome thing for the busy surgeon. We generally have the patient, after the injection, remain aside a little while, whilst other operations are being performed. If we have to wait half an hour instead of fifteen minutes, it does not matter, as anæsthesia will

still be effective. If no clinical demonstration is intended, the anæsthetising work is previously done by an experienced assistant.

Other forms of conductive anæsthesia by perineural injection (for instance, Krogius's method) have also been considerably improved by the addition of suprarenal preparations, inasmuch as their vaso-constricting properties permit of a more intense action upon the nerves. It thus replaces the troublesome artificial ischemia of the extremities induced by Esmarch's bandage, which, according to Corning, was formerly an essential means of intensifying and prolonging anæsthesia. It is only Oberst's excellent anæsthesia that may still be produced in this way. When making a trial on his own finger the operator will find that the troublesome constriction bandage, as far as this limb is concerned, is easily tolerated, especially when, by the injected agent, the whole finger is quickly anæsthetised. But in this case also the suprarenal preparations have contributed to the development of anæsthetising methods, inasmuch as they have taught us how to apply Oberst's principles of anæsthesia to other parts of the limbs, where the constriction bandage cannot be made use of without molesting the patient. As to conductive anæsthesia of large nerve trunks by perineural and peripheral injection, it has always been uncertain or impracticable, in spite of the addition of suprarenal preparations to the anæsthetic. Even medium-sized nerves can only be securely anæsthetised when they are situated close to the skin or the mucous membrane, *e.g.* the ulnar, median, and inferior dental nerves.

Conductive anæsthesia by endoneural injection of the anæsthetic into large nerve trunks, for instance, the great sciatic and anterior crural nerves, far away from the field of operation, has always been a procedure which cannot be recommended, as it presupposes preliminary operations almost as important as the intended operation itself.

There is also the obsolete method of Cushing, of interrupting by endoneural injection the conductive faculty of the nerve branches, after having traced them within the operation wound made by the aid of infiltration anæsthesia. As we have convinced ourselves, his procedure, which is much used, for instance, in the radical operation for inguinal hernia, has been rendered superfluous by Braun's latest procedure of subcutaneous perineural injection on the nerves leading to the hernia.

Now and then it will be of advantage to combine local anæsthesia with a previous dose of morphia, or with scopolamine-morphia drowsiness. This specially refers to excited patients suffering from Basedow's disease.

I have thus given you a general view of the universally recognised methods of local anæsthesia. Since the introduction of Schleich's infiltration anæsthesia, remarkable progress has been made, enabling us to perform a high percentage of rather important operations with the aid of local anæsthesia.

VEIN ANÆSTHESIA.

Some time ago I was able to add to these methods another means of inducing local analgesia, namely, *vein anæsthesia*, of which I beg to give full particulars.

The large nerve trunk is protected against the introduction of anæsthetics by its surrounding connective tissue, which is proved beyond doubt by spinal anæsthesia. Small doses of anæsthetics brought into contact with medium-sized peripheral nerves will not change their power of conducting sensations, while these agents will produce anæsthesia of surprising extent, and even of the whole body, when they hit upon an uncovered nerve of the spinal canal. The way to produce quick and successful local anæsthesia of extensive and deeply situated parts of the body is thus clearly outlined: it means overcoming the protecting connective tissues of the nerves. If we succeed in this, quite small doses of the narcotic poison will suffice to interrupt conduction of pain and sensation. The most natural and simple way to bring the anæsthetic in contact with the substance of the nerve, its ramifications, and the nerve ends, is by the channel of blood circulation. This way is practicable in all cases in which artificial ischemia can be produced by Esmarch's bandage. An ideal means, perhaps, for diffusing the anæsthetic within the limbs would be the artery. It need scarcely be said that this would be practically useless. Apart from the fact that the technical details of the injection are difficult, it requires an important and troublesome operation to be carried out by the aid of ordinary local anæsthesia prior to the real operation.

Now I was able to prove by experiments that a coloured solution injected into the cutaneous vein of an amputated limb

quickly spread in a rather uniform manner all through the tissue.

The Instrument Set.—The syringe I use is of Janet's pattern, graduated and of 100 c.cm. capacity. It consists of a glass barrel surrounded by soft metal and a ground metal piston.

To the nozzle of the syringe a very stout rubber tube is attached, which bears at its distal end a little cone with bayonet pin fitting exactly the corresponding bayonet slit of the infusion cannula. By means of this bayonet device the syringe can be attached or removed with ease. To prevent the liquid running out after the removal of the syringe, the cannula is provided with a stopcock.

The cannulae, which ought to be very thin, are made in three sizes, namely, of 1.5 mm. for children, 1.75 mm. and 2 mm. diameter. The largest size is especially intended for injections into the much dilated saphena vein in extirpations of varices. Near the end of the cannula there are two circular grooves, to which the vein is tied by a ligature. These grooves are not filed in, but stamped, as it is only in this way that the necessary depth can be obtained. The whole syringe can be sterilised by boiling, but before doing so the piston must be removed. Start boiling with cold water, and let the syringe cool down before putting it together. Moisten the piston a little before trying to insert it again. Physiological solution of chloride of sodium is the best medium for boiling purposes. Never use soda or other alkaline solutions.

A thoroughly reliable instrument set is indispensable to make anaesthesia a success. In some cases the injection can only be made under high pressure. If the grooves are not deep enough, the cannula will slip from the vein. This will especially happen when trying to inject into the stout and much dilated saphena vein with signs of varicose degeneration. The rubber tubing must be of great resistance, as otherwise it will give way or burst after having been boiled a few times. Common rubber tubing is of no use. The operator will preferably use a sufficiently stout elastic Nélaton catheter of small lumen.

As an *anæsthetic* we only use the isotonic novocaine solution of 0.5 per cent., that is to say 0.5 gr. of novocaine dissolved in 100 c.cm. of physiological solution of chloride of sodium. Shortly before being used the solution is sterilised, and is then injected at a temperature corresponding approximately to that of the human body. As a rule we inject 100 c.cm. of the solution in

the lower extremities, and 50 to 80 c.cm. in the upper extremities. When these quantities are adhered to, no poisonous complications will arise. We never injected more than 100 c.cm.

Ischemia or Depletion.—Complete ischemia or depletion is of the greatest importance. It may be taken as a strict rule that the more thoroughly blood has been expelled from the part of the limb destined for injection, the better and quicker anæsthesia will take place. There would be anæsthesia anyhow, and in spite of the vessels containing a considerable quantity of blood, but it would set in far later. To empty the vessels, the rather old-fashioned Esmarch's elastic constriction bandage is tightly wound in a spiral manner around the limb, commencing at the distal end, and going upwards to the point where the central bandage is to be applied. Several turns of the bandage are applied, one above the other, near the part of the limb to be treated by the anæsthetising injection, in order to arrest blood circulation as much as possible. Should it be impossible to start encircling the limb from its distal end, for instance in cases of serious infection, it will be advisable to express the blood at least from the part chosen for injection, in order to obtain indirect anæsthesia, the more so as in such cases direct anæsthesia will prove to be impossible.

If there is nothing left, the operator may latterly incise the subcutaneous vein traced after the application of the elastic bandage, squeezing out the blood as much as possible through the incision, which may serve later as a site for introducing the cannula.

The bandage may be tied without hesitation round fistule of long standing or tuberculous articulations.

Near the upper border of the expulsion bandage, that is to say, a little ahead of the part to be operated upon, the proper ischemia bandage is applied. It is not advisable to apply it forcibly in the usual manner, one turn fitting exactly over the other like an ordinary bandage or tubing, as this will cause an annoying sensation of pain. A soft thin rubber bandage is to be used instead, which is put round the part of the limb in many turns, covering a rather large surface. It is only in cases where the bandage would occupy too much space that it is applied one turn exactly over the other.

But even a bandage applied to an unanæsthetised limb, in the right manner as described, will soon become troublesome to the patient. There are two disadvantages—the bandage causes local pressure, and soon disagreeable paræsthesia and sensations of pain extending all over the limb will arise.

The latter need not be taken into account, because they cannot gain ground in vein anæsthesia, seeing that the entire limb below the constrictor will be anæsthetised.

We only have to deal with local pressure caused by the bandage, which will be mitigated by the manner of application described, and there is the advantage of the anæsthetic reaching below the bandage, thus contributing towards the relief of pain. A great many patients, therefore, do not complain at all, they only speak about a little pressure, while others complain of a sensation of considerable pressure. There are two means to avoid the latter inconvenience :—

1. Just below the upper ischemia or depletion bandage another bandage, extending over a surface already anæsthetised, is applied, and the first one removed.

2. A subcutaneous injection of about 20 c.cm. of 0·5 per cent. novocaine, plus 2 drops of suprarenin, is made round the limb near the upper border of the bandage. By this the skin reaching below the bandage is anæsthetised, affording relief from the pressure.¹

A second elastic bandage similar to the first is applied a little below the field of operation, and the novocaine is injected into the vessels lying between the two bandages.

The space between the two bandages should not be less than 10 cm. and not greater than 30 cm.

I beg to observe for the present that soon after the injection of the anæsthetic the whole part of the limb lying below the ischemia bandage will be entirely benumbed. Anæsthesia which takes place at once between both bandages is called by me *direct*, whilst anæsthesia below the lower lying bandage, which will appear a little later, is termed *indirect*. We also tried to eliminate the peripheral bandage, and to inject the solution into the whole part of the limb lying below the ischemia or depletion bandage. But this is only advisable in cases where there is a chance of making the injection into a vein somewhat above the articulation of the foot or the wrist. In all other cases I strongly advise that two bandages be applied, and that the injection be made within the intermediate space.

It is understood that ischemia or depletion must be reliable, as otherwise there will be danger of the anæsthetic quickly reaching the main circulation with poisonous effect. Or there

¹ This procedure was suggested by a lady medical student.

may be venous hyperæmia, retarding anæsthesia or making it incomplete.

For the entire leg of a muscular man the length of the expulsion bandage must be about 6 m. 50 cm., and for the entire arm about 3 m. 50 cm., the length of the ischemia or depletion bandage for the upper part of the thigh about 3 m. 50 cm., and for the upper arm about 2 metres. If used in septic operations, the bandages are boiled, otherwise they are kept in carbolic acid solution.

Tracing of the Subcutaneous Vein.—Any subcutaneous vein may be used for injection, provided its diameter is large enough to receive the needle with ease. Never choose veins which are too thin, as it will be difficult to insert the cannula. As a rule the veins of the forearm of healthy men are well developed, and may be seen shining through the skin. The more lean and muscular the body, the more will this be the case. By applying a tourniquet to the upper arm, or by getting the man forcibly to clench his fingers and open them again in rapid succession while the operator encircles the arm with his hand, the veins will be rendered still more conspicuous. This is true also of the larger subcutaneous branches in the arm, such as the cephalic and median basilic veins. But in most cases the operator will look in vain for a suitable vessel in the upper parts of the legs or in diseased arms. For these reasons it is advisable to trace the more important subcutaneous veins—the long saphena vein of the leg, and the cephalic and median basilic of the arm—according to their anatomical position. With the aid of these veins it will always be possible to produce anæsthesia of the entire part of the limb lying below the seat of injection.

The long saphena vein is easily traceable from the articulation of the foot up to the saphenous opening in the thigh. Its radix lies below in front of the inner ankle. It then turns backward, crossing the tibia in an oblique direction, and up to this point it may be distinctly seen shining through the skin. In the lower part of the leg it takes its course somewhat behind the inner edge of the tibia. Just below the knee-joint it turns again backwards, runs at the level of the knee-joint about half an inch behind the internal condyle of the femur, and in the middle of the upper part of the thigh, that is to say, the middle of the inner side of the knee-joint fissure up to the pubic bone, it still goes at least two-thirds of an inch backward off the femur, then it turns again to the front, and it keeps a line which may be drawn from

the latter point to the saphenous opening. It may be stated for practical purposes that in the lower half of the upper part of the thigh the beginner generally inclines to look for the vein a little too much in front. It is therefore advisable to mind the anatomical topography as here given (Fig. 1).

Only once was I not able to trace the long saphena vein. In this case I looked for it about the middle of the lower part of the thigh, among a great many cicatrices due to incisions made for sequestrotomy at the lower end of the femur. By one of the incisions the vein had evidently been separated, and subsequently obliterated. In similar cases I should now look for the vein at some distance above the cicatrices, say, a little ahead of the knee-joint. I should then inject into the part of the limb situated between two rubber bandages, and perform the operation with the aid of indirect anæsthesia.

In addition to the long saphena vein the short saphena may be used for anæsthetising purposes. The course of this vein, too, will be easily traced, but hitherto I have never made use of it for anæsthetising. It may be used to advantage perhaps for direct anæsthesia, as I shall explain later on.

For vein anæsthesia of the arm, the cephalic vein, the basilic vein, and the median vein of the forearm, or rather the median basilic and cephalic veins at the bend of the elbow, have to be taken into account. There is no vein of the skin which could be as easily made conspicuous and traceable as the median vein.

A mistake, which is quite important for our purposes, is contained in all anatomical guide-books within my reach, to the effect that the course of the cephalic vein in the upper part of the arm corresponds to the sulcus bicipitalis lateralis. This vessel, of somewhat variable position, is usually traced much more in front on the external side of the biceps, three-quarters to one inch from the middle line of the muscle in an adult.

Twice I did not succeed in finding the cephalic vein when I tried to trace it according to its anatomical position, and then I had to make use of the basilic vein.

It seems to me that the stoutest subcutaneous vein of the arm, namely, the basilic, is more constant; in fact, I have never failed to find it. It generally follows in its course the sulcus bicipitalis internus up to the hiatus semilunaris, situated a little below the centre of the upper arm, where it disappears below the fascia. It rarely deviates from this course. It is accompanied by the internal cutaneous nerve, and care must be taken not to tear the latter unnecessarily when doing the dissecting work.

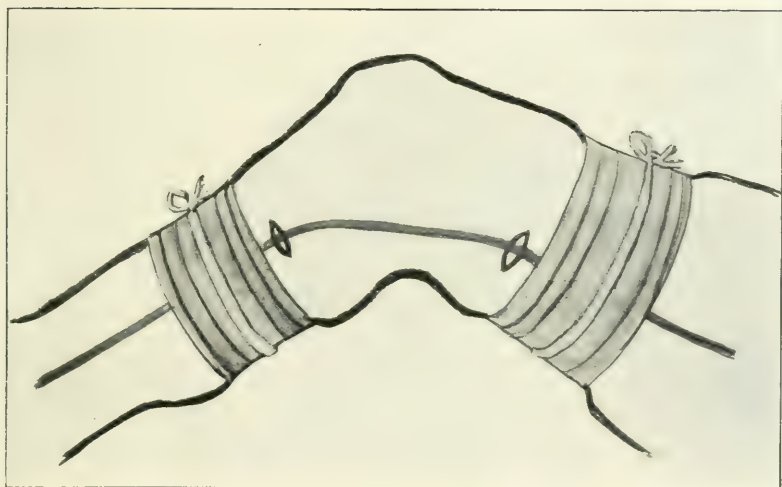


FIG. 1.



I have observed the basilic vein to disappear much below the centre of the upper arm, right under the fascia brachii. But even then it will be easily found after incision of the fascia, corresponding to the sulcus bicipitalis lateralis.

As a rule, there is no difficulty in discovering a sufficiently large vein shining through the skin of the forearm. After exposing it under ischemia, as we generally do, its course is made conspicuous in some way or other within the covering of skin—iodine tincture, methyl-violet.

Sometimes a vein shining clearly through the skin proves after its exposure to be a fine branch quite unfit for the introduction of the cannula. It will therefore be best to keep to the principal veins of the skin, as already described. The tracing of the vein is always done with the aid of Schleich's infiltration anaesthesia. For this purpose we use 0·5 per cent. novocaine solution, and we advise the addition of suprarenin when tracing the vessel without existing ischemia. This more efficient concentration is used in preference to Schleich's solution, or its corresponding solution of 0·25 per cent. novocaine, as the veins of importance to us are often accompanied by fine nerve branches, for the anaesthetising of which such weak solutions will prove insufficient, at least in cases where it is intended to perform the insignificant operation immediately after the infiltration.

For the same reason it will be necessary thoroughly to infiltrate not only the skin, but also the subcutaneous cellular tissue, notably in fat people.

If the operator does not take these precautions the insignificant pre-operation will be the only procedure not quite free from pain, for instance in elbow or knee-joint resection. Should it be impossible to perceive the vein through the skin, it must always be traced by cross-incision, the centre of the incision corresponding to the presumptive position of the vessel. The skin and subcutaneous cellular tissue are retracted by hooks provided with several prongs of sufficient width to retain nearly the full length of the wound edges, care being taken with fat people to include all the protruding fat, as otherwise the operator is liable to overlook the vessel embedded in fatty-masses. This must be borne in mind, especially in women, when performing resection of the knee-joint for existing or cured tuberculosis. Notwithstanding the atrophy of the entire limb, the part of the long saphena vein we specially care for will be found deeply hidden in fatty masses on the fascia. Small vein branches, which are cut through, must be

seized and ligated. Sometimes attention is drawn to them only by the flowing out of the anaesthetising solution at the beginning of the injection. As a rule, exact dissecting work is not necessary. It will be quite sufficient to put a blunt Deschamp's needle, provided with a thin silk thread, round the vessel after its exposure, sliding the needle to and fro within a space of one-half to three-quarters of an inch, in order to detach the vessel without the use of a cutting instrument. The basilic is the only vein I am in the habit of exposing more carefully, considering the fact that even an infiltration of 0.5 per cent. novocaine solution is sometimes insufficient to anaesthetise the accompanying internal cutaneous nerve, particularly if it is intended to operate immediately after the infiltration.

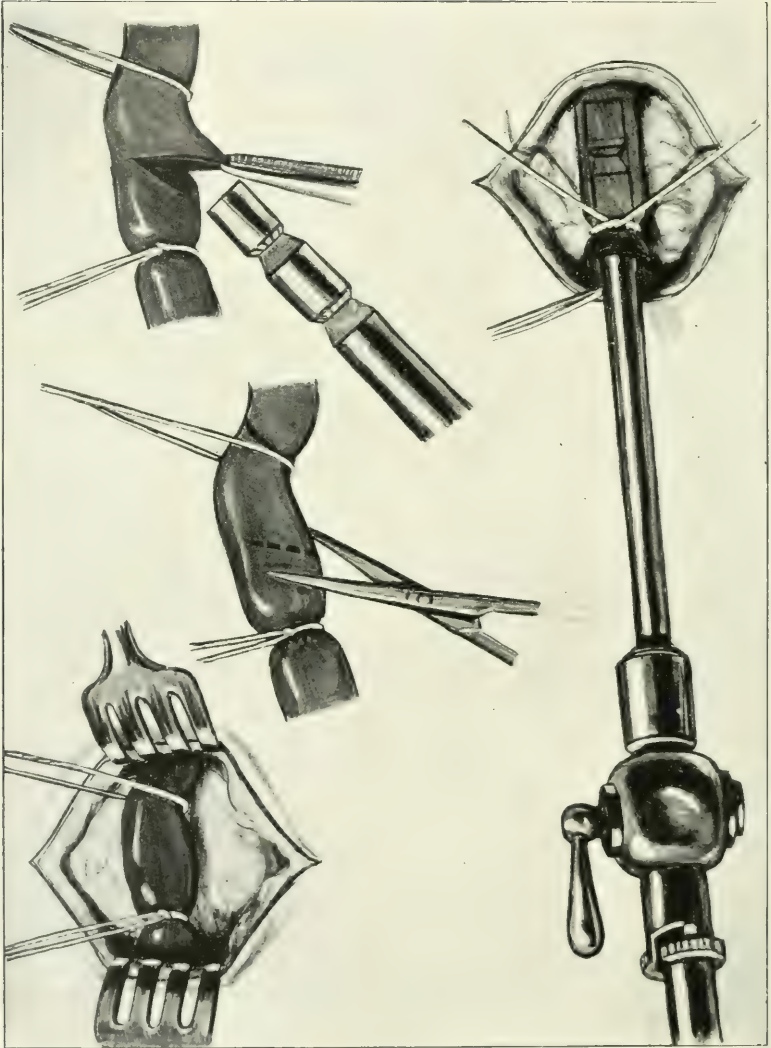
The anaesthetic may be injected into the vein either in a peripheral or in a central direction. At first I advised that the injection be made in a peripheral direction towards the valves, because it appeared to me, after experimenting on animals, that the elastic constriction bandage was not able to withstand the pressure exercised by the injected solution, and that consequently there was a danger of the poisonous solution overcoming the pressure of the bandage and reaching the main blood circulation. It was found out later, however, that as far as the human subject is concerned, this danger does not exist. Lately I have made quite a number of injections in a central direction without injurious consequences.

In injecting in a peripheral direction, the vein valves scarcely offer any resistance; on the contrary, they usually give way at once.

When injecting in a central direction the part of the vein near the lower bandage is chosen, and in injections in a peripheral direction the part quite close to the upper bandage. The easily traceable median vein of the forearm is particularly suited for injections in a central direction.

If a peripheral injection of the subcutaneous vein is not practised right below the upper bandage, a small strip of the skin below the bandage will remain unanaesthetised. This strip will be wider at the side opposite the spot of injection. Deep anaesthesia will reach far wider towards the bandage, even extending underneath it. It can be proved by experiments with amputated limbs that the injected fluid takes a calotte-shaped progression in an upward direction.

If the injection is made too far away from the central or



proximal bandage, a considerable portion of the skin below the bandage will remain sensitive, and painless operating within this part will be impossible. This refers principally to knee-joint resection.

I have already explained that the exposed vein is to be detached by means of a blunt Deschamp's needle provided with a thin silk thread. The needle is withdrawn, but the thread remains, and serves for ligation of the vein on the opposite side of injection. If preservation of the vein is considered important, ligation may be dispensed with, and a suture applied to the hole which was made to introduce the cannula. The ends of the thread are not yet cut off. At some distance from the first a second thin thread is put round the vessel (Fig. 2), and a lateral incision is made into the vein with a pair of fine scissors whilst the assistant stretches the vein with the aid of the first thread (Figs. 3 and 4). Through the opening thus made the cannula is deeply inserted, and while the assistant ties in the cannula with the lower lying thread, pulling it tightly, the operator slowly withdraws the cannula, until the thread catches in the groove (Fig. 5), after which a second knot is tied upon the first. In this way the groove cannot be passed over. Never push in the cannula with force, as otherwise it may happen that it penetrates between the intima and the other coats of the vessel. The cannula having been tied in, the operator makes sure by gently pulling it that it will not slip. It is best to insert the cannula with the syringe containing the fluid attached to it. The syringe is placed on or near the covered sterile limb in such a manner that its rubber tube does not hamper the manipulating of the cannula. It is, of course, possible to introduce the cannula separately, and to attach it afterwards to the syringe containing the solution by means of the bayonet device. The stopcock of the cannula is then opened, and the solution injected, while the assistant sees to the vein keeping its natural position. As a result of the injection there will be a fairly regular swelling of the part situated between the two bandages, especially in a thin limb. If all the blood has been expelled, the paleness of the skin, due to ischemia or depletion, will still increase, but in most cases it will assume a bluish tint, on account of the liquid penetrating quickly into the deeply situated veins, thereby forcing the remaining blood towards the skin. The infusion of the liquid produces a feeling of swelling, or a sensation of cold, if the solution is of a low temperature; or a sensation of heat, if it is of the body temperature, or somewhat below that.

Patients who are not abnormally sensitive state that no sensation of pain attends the injection, but timorous patients are inclined to complain a little when noticing the infusion of the liquid.

After the injection the stopcock is closed, and the syringe removed from the cannula, the latter remaining in the vein until the operation is finished. I shall explain later how the cannula may also do good service in tracing severed vessels.

Anæsthesia.—In describing anæsthesia let us take for guidance Fig. 6. An expulsion bandage was tied round the disinfected limb, encircling it from the finger-tips up to the middle of the upper part of the arm. An ischemia or depletion bandage is applied to the upper part of the arm at *a-b*, and a second rubber bandage at *c-d*. The spot showing the exposed vein is marked by a cross, and 50 c.cm. of 0·5 per cent. novocaine solution are injected. Shortly

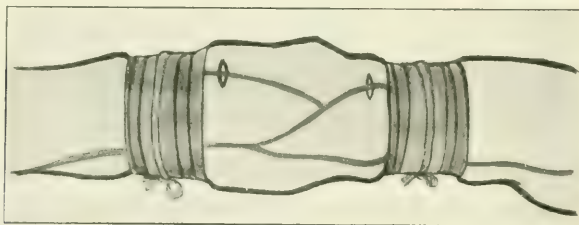


FIG. 6.

after the injection the part situated between the two bandages has been perfectly anæsthetised, except the small zone just below the upper rubber bandage, as already described and marked by oblique lines in the figure. With stout legs the zone is larger, and it is broader on the outer side opposite the spot of injection. Anæsthesia penetrates the whole of the limb. A very sensitive contracted elbow-joint may be bent directly after the injection, and resection may be carried out without pain being felt by the patient.

Anæsthesia of the part of the limb situated between the two rubber bandages I term *direct anæsthesia*. It is not, as it may seem at the first glance, a purely terminal anæsthesia. Immediate benumbing of the nerve ends is, of course, the principal thing, but small and medium-sized nerves are also paralysed at once. Only the large nerve trunks retain their conductive faculties, but the direct sensitiveness of these has also disappeared before indirect anæsthesia takes place, and consequently their power of

conduction has not yet been lost. I have frequently performed elbow resection immediately after the injection of the anæsthetic, pulling the ulnar nerve aside, together with the flesh covering it, without any complaint of pain, though sensitiveness of the part underneath the bandage still continued to exist. Similar convincing observations were made in amputations executed with the aid of vein anæsthesia.

Six minutes after the injection the entire part of the limb situated below the peripheral bandage is rendered completely anæsthetic. One minute later motor paralysis and loss of sensation of the limb and its adhering parts will take place. Any operation, from the upper ischemia or depletion bandage down to the finger-tip, may now be performed without causing pain.

Anæsthesia produced below the peripheral bandage I call *indirect anæsthesia*. It is a regular conductive anæsthesia, originating in the paralysis of the large nerves after the anæsthetic has been brought in contact with their inner structure through the blood channel. As in other methods, for instance Oberst's procedure, it takes a downward course, the peripheral parts of the limb being the last to lose sensation. On the side of injection indirect anæsthesia sets in sooner than on the opposite side, at least as far as the skin is concerned. It takes its most rapid course within the zone of small sensitive nerve branches, which, in direct anæsthesia, immediately lose their conductive faculties.

The rapidity with which anæsthesia ensues depends upon the following circumstances, in addition to the use of a sufficiently large quantity of the solution:—(1) Ischemia or depletion must be as complete as possible. (2) Dimensions of the part of the limb under treatment: in stout parts anæsthesia, and notably direct anæsthesia, will set in gradually as a rule within five minutes; in thin parts it will take place at once. After direct anæsthetising of the region of the knee-joint the injected inner side shows the anæsthetising effect at once, while on the outer side it will take place gradually. Anæsthesia is accelerated on this side by moving the limb or rubbing it gently with the hand from the inner towards the outer side. (3) There are cases of rapid or even immediate anæsthesia after injection, and other cases in which it is retarded, the cause of which cannot be explained.

Anæsthesia will eventually set in, provided all technical details have been observed. It may be said without hesitation

that it is more reliable, and that it has given better results, than any other method of local anaesthesia.

In most cases direct anaesthesia takes place at once, enabling the operator to proceed, for instance, to resections of the knee- or elbow-joint directly after the injection. But it is of advantage to wait some two to five minutes, particularly in operations on the leg; and if we do not want to leave the cannula *in situ*, we may meanwhile proceed to the treatment of the wound which had to be made for the exposure of the vein.

Should direct anaesthesia not set in within five minutes, there has been some technical mistake, the worst being incomplete ischemia or depletion.

Indirect anaesthesia sets in with varying rapidity. Sometimes it follows the injection almost immediately, the maximum delay being twenty minutes. In anaesthesia of the arms the delay is reduced to from six to ten minutes.

As soon as anaesthesia has taken place, the peripheral bandage is removed.

In deep lying parts indirect anaesthesia seems to set in sooner than in superficial ones. I came to this conclusion because I noticed that painful and stiff articulations, notably joints of the fingers, could be painlessly moved soon after the injection, while the skin still remained sensitive. The nerves of the articulations may possibly be more susceptible to the poison.

When trying to perform a plastic operation on the tendons of an arm afflicted by a serious post-hemiplegic chorea, I was able to state that, though the skin was still sensitive, and paresis of the muscles was still absent, the movement was arrested at once after an injection round the elbow-joint. It had been stated before that artificial ischemia or depletion had no influence in this direction.

A few words must still be said about motor paralysis, which was complete soon after relaxation of the muscles had taken place simultaneously with indirect anaesthesia. There is nothing surprising about this, knowing, as we do from a good many other investigations, that our common anaesthetics will not only interrupt sensory but also motor conduction of the nerves, with the only difference that sensory conduction is interrupted sooner and in a more complete manner. Therefore, as soon as we notice motor paralysis, we may be sure that sensory paralysis is also total. We infer from this as a practical rule that, when availing ourselves of indirect anaesthesia, we have to postpone the operation until at least a considerable paresis has taken place. But in most cases we

wait until total paralysis has set in. Of the sensory faculties, the sensibility to temperature disappears first; it is followed by the loss of sensibility to pain, and finally to touch. They will reappear in the inverse order.

After the removal of the ischemia bandage, motor paralysis will be first to disappear, in many cases almost at once. A little later, that is to say, some two and a half to seven minutes after the removal of the bandage, sensibility will also reappear.

The fugitive character of the anæsthesia is the weakest point of this method. It compels us to see to hæmostasis and suturing when artificial ischemia is still present. While this presents no difficulty to the experienced surgeon, it means a great drawback to the less experienced. In some operations it exposes the patient to the danger of subsequent hæmorrhage if the ligation of the vessels has not been done with great care.

We therefore tried to make the anæsthesia last somewhat longer, to avoid its being carried away directly by the current of blood after the cessation of ischemia. The use of stronger concentrations of novocaine was not sufficient, as anæsthesia produced by 1 per cent. novocaine solution is almost as fugitive as a solution of $\frac{1}{2}$ per cent. The most natural thing was the addition of suprarenin preparations, so successfully used by Braun in surgical local anæsthesia. One was even entitled to expect something more than a mere prolongation of anæsthesia after the removal of the ischemia bandage. It was to be anticipated that the preparations injected into the vessel would prevent the annoying reactive hyperæmia following Esmarch's procedure for producing ischemia.

I have never noticed that suprarenin caused injurious effects upon the vessels. The well-known investigations of Fischer and others, respecting the production of arterial necrosis and aneurysm by the injection of adrenaline into the vessels of animals, need not frighten us. To produce degeneration of the vessels, B. Fischer was compelled to administer repeated doses of such size—21 intravenous injections of 0.3 to 0.5 c.cm. adrenaline (1:1000) in rabbits—that his researches are really of no practical value for us. And then he was only successful with rabbits.

But, further, suprarenin, which was used by us repeatedly and in different concentrations, proved to be a failure: it even happened that anæsthesia was incomplete.

Hæmostasis is secured in the following manner:—(1) The cannula is left in the vein. After ligation of the visible vessels, an injection of physiological salt solution is made by means of the

Janet's syringe primarily attached to the cannula. The solution flows off the wound, and it spurts in jets from the vessels, which require to be tied. Such vessels are secured with forceps and ligated. (2) The ischemia bandage is detached, and vessels which are still bleeding are quickly grasped. The bandage is applied again before anæsthesia passes off.

Whenever possible, we avail ourselves of direct anæsthesia, the more so as it enables us to start operating immediately after the injection.

Danger of Poisoning.—It is a well-known fact that poisons injected direct into the blood channel are far more dangerous than poisons introduced into the body by subcutaneous or intramuscular infusion. This might lead us to believe that vein anæsthesia was very dangerous, because after the removal of the ischemia bandage a good deal of the anæsthetic will reach the main blood circulation and poison the central nervous system. Such accidents need not be apprehended. In ischemia the anæsthetic leaves the veins and is retained by the tissue, and notably by the nerve substance. Its poisonous effect is therefore not greater than a subcutaneous application in conjunction with suprarenin preparations. That the poison is actually retained by the cellules may be proved by the fact that irrigation of the anæsthetised region with an abundant quantity of physiological salt solution, carried out in the same way as the injection of the novocaine, does not influence sensory or motor paralysis.

There can thus be no question of poisoning, provided the ischemia is quite reliable and the doses of novocaine, as stated above, are not surpassed. Should the operator still be in doubt about this, two plans are left to him to exclude the risk of poisoning:—

1. He may leave the cannula *in situ* with its stopcock closed until only the ligating and suturing work remains to be done. With the aid of the syringe attached again to the cannula he then irrigates the whole system of vessels with a warmed physiological salt solution. In direct anæsthesia, where the wound is in the part situated between the two bandages, the solution will be seen spurting from the skin, even from the marrow of the bone. In indirect anæsthesia also, with a wound at some distance away from the anæsthetised part of the limb, the fluid in the vessels can be swept away after the removal of the peripheral bandage. The procedure may even be used to advantage in cases in which anæsthesia has been used to perform a non-cutting operation, as

the enormous dilution produced by the solution of chloride of sodium will be apt to reduce considerably the poisoning power of the anæsthetic. When these precautions are taken, abundant quantities of the anæsthetic may be injected.

2. To avoid poisoning by cocaine in local anaesthesia or artificial ischemia, we proceed, as we generally do in cases of bites of serpents, namely, by detaching the constrictor for a short while and applying it again, and then finally removing it later on. In this way the poison enters the main circulation in two intervals. When the ischemia bandage is removed slowly, the arteries open sooner than the veins. For these reasons I generally detached the bandage before doing the suturing work or closing the wound, in order to make the contents of the vessels flow off, that is to say, I removed the peripheral bandage, detaching the central bandage only to such an extent that the limb acquired a reddish colour, and finally considerable bleeding ensued from the wound. Without much loss of time the full length of the bandage was put round the limb and properly tied again, to ensure a new and complete ischemia. I do not now follow the above described rules, considering the fact that with 100 c.cm. of 0·5 per cent. novocaine solution no cases of poisoning came to my notice. I only practise infusion of physiological solution of chloride of sodium in order to trace severed vessels, as already mentioned.

With the aid of vein anaesthesia all operations on such parts of the limbs as permit of the production of artificial ischemia may be performed without causing pain. I only know of one contra-indication, namely, operations on account of diabetic or senile gangrene, which are also not very suitable for local anaesthesia. And if the operator does not like to proceed to general anaesthesia, he had better resort to spinal anaesthesia.

Of course vein anaesthesia is only recommended in cases in which simple local anaesthesia is difficult or impracticable. Vein anaesthesia is reserved for important operations on the limbs, the principal operations performed by us being: amputations, resections, arthrodeses, arthrotomy, sequestrotomy, osteotomy, bone suturing, transplantation of tendons, extensive phlegmons, &c. Reposition of fractures, too, which generally requires general anaesthesia, may be performed with the aid of vein anaesthesia, as the muscles will relax even more than in general anaesthesia.

In all we have treated hitherto 244 cases with the aid of vein anaesthesia. Out of the first 134 cases 5 were failures, but lately failures have almost entirely ceased.

THE CAUSES AND PREVENTION OF BLINDNESS.¹

By GEORGE MACKAY, M.D., F.R.C.S.,

Ophthalmic Surgeon to the Royal Blind Asylum, &c., Edinburgh.

LADIES AND GENTLEMEN,—When I was invited to come and address you to-day it occurred to me that it might interest you who work among the blind if I could put before you some information as to the causes and prevention of blindness. But as we cannot discuss this subject intelligently without a clear understanding of the mechanism concerned in the act of seeing, I hope you will bear with me if I offer a preliminary discourse on the structure and function of the eye and its appendages.

(A brief exposition of the structure and function of the eye, illustrated by appropriate diagrams, having been given, the address proceeded as follows):—

The sense of sight may be interfered with in many ways, but the main causes of defect are divisible into the following groups:—

Group I. Defects in shape or construction.

„ II. Loss of transparency, from injury, inflammation, &c.

„ III. Alterations in the pressure of fluid within the eye.

„ IV. Failure in nerve-conducting power in the eye itself, the optic nerve, or the brain.

Almost any of these may be congenital, *i.e.* present at birth, or may result in later life from inherited tendency, or may be acquired by accidental injury, by infection or poisoning of the eye or nerves directly, or by infection, in the widest sense, through the system indirectly.

GROUP I.—*Defects in Shape or Construction.*—A large proportion of infants are born with eyes which are under the normal standard—hypermetropic. The result of that is to throw extra work upon the focussing mechanism and give rise sooner or later to sensations of discomfort and fatigue in reading or near work, even in early life, frequently causing irritation of the eyes or lids, sometimes headaches, sometimes squinting, and other more remote symptoms of distress resulting from the strain on the ocular

¹ Delivered at the annual meeting of the Scottish Outdoor Blind Teachers' Union, held at Kirkeady, 10th June 1910.

muscles. If the eyes be otherwise healthy, this defect, so far as it is purely optical, can be remedied by convex glasses. Its recognition and correction is of the highest importance in connection with the eyesight of school children as well as adults, but it rarely constitutes a cause of blindness within the sphere of your activities.

Occasionally, however, infants are born with eyes so *abnormally small* as to be of little or no service. Here is an illustration showing the condition known as microphthalmus. In this particular case the lids are poorly developed also, and the lower lids are everted. All degrees of diminution are met with, and one or both eyes may never be developed at all.

More frequently one or both eyes are *abnormally large*, due to over-distension by the contained fluid during the later period of embryonic life or infancy. Of this condition I show an illustration. It is termed megalophthalmus or buphthalmus. It may occur in several members of the same family, and may be transmitted like any other feature from parent to offspring.

A third variety of deformity in the front of the eye is due to the cornea becoming *conical* in shape. This rarely leads to total blindness, but in advanced cases it very seriously interferes with, or may prohibit the use of, the eyes, especially for sedentary occupations, the more so when accompanied by opacity at the summit of the cone.

Sometimes the whole or part of the iris or choroid is congenitally absent. Sometimes there is a partial dislocation of the lenses, and markedly defective vision usually accompanies such abnormalities. But the most important and certainly the most frequent deformity of all is that which results from a stretching of the coats of the eye, notably at the back wall, whereby the originally globular or nearly spherical eyeball tends to become more egg-like in shape, with its greatest length fore and aft, and the sensitive photographic membrane, the retina, recedes from the lens so that the image of a distant object is no longer focussed upon it unless a concave spectacle glass is put before the eye, or the distance between the eye and the object is greatly reduced. This is the familiar condition of nearsightedness or *myopia*. Very few children are born with nearsighted eyes, but a considerable number develop myopia during school life, or later, if the eyes are much applied to near work. It is a condition liable to progress with growth and study, or too continuous occupation at near work, and in advanced cases may lead to so much stretching of the

coats of the eye as seriously to damage its vision, making ordinary reading and fine work impossible. The prevention of the development of myopia, not only by the use of appropriate spectacles, but by careful attention to lighting, attitude, and the amount of near work demanded of the eyes, is a most important consideration in connection with the education of youth and the selection of a suitable occupation in life.

A further danger to which such eyes are specially liable, either with or without any direct injury, is *detachment of the retina*. This is the result of fluid being effused between the retina and choroid, so that the former bulges forward and loses its proper position for focussing images and its capacity for conducting accurate nerve impulses to the brain.

GROUP II.—The largest number of blind persons are found in my second group, namely cases in which *loss of transparency* in the eyes is the cause of blindness. Here, again, the defect may be congenital, children being born with eyes which have dull or opaque instead of clear glassy cornea. That is fortunately a rare occurrence. The little bow window (the cornea) of the eye, upon whose perfect curvature and transparency depends the proper entrance of light to the interior of the eyeball, is liable to damage at any moment from the cradle to the grave. A slight wound, the prick of a thorn, any small sore or pimple on the skin of the hand or even the face may leave a little scar without interfering with the usefulness or even the beauty of either part. But it is very different on the front of the eye. Over and above the temporary discomfort or pain occasioned by an abrasion of this acutely sensitive surface there is the risk of permanent loss of transparency if any scar remains. When you realise that the total thickness of the cornea is less than $\frac{1}{12}$ th of an inch, and that a wound or ulcer which penetrates say $\frac{1}{4}$ th of this depth is bound to leave some permanent mark of its occurrence, you will appreciate the peril to which an eye is subjected by a mere scratch or the lodgment of a foreign body, or a scald, or burn with lime or other caustic material. Still more disastrous results follow a complete penetration of the cornea, for even though the foreign body be of sufficient length to fall away from the eye, or be promptly withdrawn, there is usually escape of fluid, the aqueous humour, from the anterior chamber, which often brings with it some part of the iris puffed out like a window curtain through a half-opened casement, which then closes upon it, strangles, mutilates, or destroys it.

But there are other ways in which the cornea may lose transparency apart from any gross direct injury.

I must take it for granted that everyone is aware that, thanks to the labours of such men as Pasteur, Lord Lister, Koch, and a host of other scientific investigators, we know that there exist in the air we breathe, the food we eat, the clothes we wear, the furniture of our dwellings, the dust of our streets, myriads of microscopic organisms, commonly called germs. What their real place in Nature is, what their origin and destiny, is as obscure to us as our own; but that they exist and that we have to reckon with their intrusion upon our affairs, sometimes for good, perhaps more often for evil, is one of the discoveries of the nineteenth century of the highest importance to mankind.

The surface of the eye of a healthy baby new born of cleanly parents is practically germ-free, and a carefully cleansed and properly nurtured infant is not likely to suffer from any inflammation of its eyes due to germ infection. But it is melancholy to find that about 30 per cent. of the inmates of every blind asylum owe their lifelong incapacity to the fact that as helpless babes their eyes became infected in the hour of birth by virulent micro-organisms obtaining an entrance between the lids and setting up within a few days a purulent destructive inflammation. If the attack is a mild one, the eyes may recover without any permanent damage; but if it be severe, the cornea ulcerates, and one or both eyes may be rendered practically useless or be totally destroyed. If we smear a little of the matter from such a baby's eye on a thin piece of glass and stain it with certain colouring fluids, we can reveal the presence of swarms of micro-organisms of a well-known type. If any other child, nurse, parent, or doctor is so unfortunate as to get some of this matter from the baby's eye into their own, the same inflammation will be set up, and the same organisms be found in the discharge.

Knowing, then, the cause, what is the remedy? To the best of our knowledge at present it consists in dropping into the eyes of the newborn child one or two drops of a solution¹ which will paralyse and kill any organisms before they have had time to multiply or burrow into the textures. Of course the remedy must be one which, while killing the germs, will do no harm to the eye. The credit of introducing this preventive treatment is due to Professor Cr  de of Leipzig, an obstetrician, and in his Maternity Hospital he succeeded in reducing the number of cases of oph-

¹ Sol. Argent. nit. 2 per cent.

thalmia among the newborn from 8 or 9 per 100 to 1 in 200. This method is extensively followed in hospital and private practice all over the world, and has been enforced by legislation in some of the progressive States of America.

The saving in infant suffering, the lifelong obligation for rescue from possible blindness, as well as the economic gain by increase of the sighted workers of the world, is simply incalculable. There are two practical difficulties in the application of this method. First, that the inflammation is very rarely present at the time of birth. It is only the infection which occurs then, and as the eyes may appear to be quite bright and clean for a couple of days, the danger is often overlooked and the remedy disregarded. This is the more unfortunate and misleading, because once the inflammation has declared itself it is much more difficult, often impossible, to arrest it until it has run its course. The second and chief practical difficulty in its application to the most necessitous cases is that there is often neither doctor nor trained midwife at hand when the infant arrives, and thus not a few of the cases which need it most do not receive preventive treatment.

Now let me ask your attention to another way in which damage may be done to the transparency of the cornea, by the introduction of micro-organisms. In various industries, such as mining, quarrying, metal turning, &c., one of the commonest incidents is for a worker to get some little fragment of coal, or stone, or chip of metal from a tool lodged on the surface of the eye. He usually seeks the assistance of some mate with the reputation of a keen eye and steady hand to remove the so-called "fire," and the first aid thus promptly rendered is in many cases so successful that nothing more is heard of the accident save expressions of gratitude from the former sufferer. But if the particle be germ-laden, or if the instrument employed for the removal of the particle be as imperfectly "sterile" in the bacteriological sense as an ordinary pin taken from Heaven knows where, or a toothpick, or the point of a pocket knife used at other times to cut cheese or tobacco, it may in the act of digging out the foreign body implant a colony of septic micro-organisms in the little wound, under conditions very favourable for their growth and development. In other cases, the wound having been received, the patient supplies the infecting organisms from his own tear sac. It is always a great mistake to neglect a watery eye and not endeavour to get the watering cured soon, for if it be due to a narrowing or obstruction in the tear duct, the tears, instead

of draining into the nose, accumulate in the upper part of the tear duct, are decomposed by germs which get access from the nose or eye surface, and the putrid fluid regurgitating against the eye inoculates any abrasion of the corneal surface and sets up destructive inflammation.

From my experience as a hospital surgeon, I venture to say that in the kingdom of Fife and in the neighbouring mining areas there is no more frequent cause of loss of vision and of wage-earning capacity than the condition of acute infection following upon slight injury, which I have just been describing. There are several virulent organisms which may induce it, but one of the commonest is the same micrococcus as excites an attack of pneumonia in the lungs. The number of cases might be diminished if more workmen could be induced to wear protecting goggles at their occupation (unfortunately they are rarely willing to do so): if they realised better the necessity for keeping their tear passages in a healthy condition; if they abstained from poulticing their eyes, as they often do after receipt of such injuries; and if they refrained from allowing anyone to remove foreign bodies from their eyes with implements ill adapted and unprepared for the purpose. Fortunately these purulent inflammations and ulcerations usually limit their sphere of action to the eye directly affected, and there is comparatively little risk of the mischief being transferred to the other eye unless it also is injured and infected independently. But when an eye has received a deeper wound, *e.g.* with a penknife, or a fork, or a bursting bottle, or when a foreign body, such as a shot pellet or other bit of metal, has lodged in its interior, there is in certain persons a very grave danger of an insidious form of inflammation being set up, which may not only destroy its usefulness, but may travel in some way or other to the other orbit and excite an equally disastrous inflammation in the other eye. To this we apply the term "sympathetic inflammation." Of its true origin we are still in ignorance. Prolonged and laborious researches have failed to give us a satisfactory explanation of its causation, nor have we any perfectly reliable means of knowing in what cases it is likely to occur. The only certain safeguard for the uninjured eye is the early removal of the primarily injured one when it is obviously useless and dangerous to its fellow.

But apart from external injury and direct local infection, many cases of corneal opacity are due to or aggravated by constitutional weakness or poisoning by diseases affecting the general

system and conveyed through the blood-stream. The ulceration of the cornea, which so often accompanies or follows measles and other debilitating illnesses in childhood, might be placed in this category. If I had been addressing you a century or two ago I should probably have had to place *smallpox* at the head of the list as one of the commonest causes of blindness. Thanks to the preventive method of vaccination, but no thanks to the anti-vaccinators, that plague has been almost stamped out, and in this generation the pock-marked face with its blinded eyes is almost unknown.

It is the aim and aspiration of modern physicians to vanquish other diseases by somewhat similar methods. By setting one living germ to do battle for our defence with another germ which is attacking us, or by utilising an extract of defunct germs to increase our resistance to living ones, we are making in these days great advances towards the subjugation of our invisible foes. Strumous constitutions fall an easy prey to the attack of tubercle bacilli, and many previously obscure cases of scar producing recurrent inflammation of the eye are yielding now to treatment by tuberculin and similar remedies, scientifically administered, along with attention to those essential hygienic requirements of fresh air and wholesome feeding.

Various acute infectious or contagious diseases may lead to blocking up of the pupil by inflammation of the iris (iritis), or clouding of the fluid or jelly-like contents of the eye, *e.g.* influenza, rheumatism, gout, typhoid fever, &c. One of the most hideous has its origin, for the most part, in immorality; can be communicated to offspring; and is responsible for sending into our blind asylums a melancholy proportion of young persons not only helplessly blind but often totally deaf.

It is a distressing and discreditable fact that nearly 50 per cent. of the inmates of some blind asylums owe their lifelong misfortune not to chance accident, or industrial injury, or unpreventable disease, but to that inexorable law which visits the sins of the parents upon the children. You will probably agree with me that both Church and State ought to protest against, or interdict by every possible means, the union of persons likely to transmit blindness or other physical defects to their progeny.

I have not yet touched upon one of the commonest causes of blinding due to loss of transparency in the eye, namely cataract. That term is properly only applicable to an opacity in or upon the crystalline lens which is suspended within the eye just behind

the pupil and iris. It may be present at birth or develop in childhood, but much more frequently as a degeneration associated with old age. It may also result at any age from injury. Whether in young or old, if uncomplicated by any other defect or disease in the eye, it is removable by operations requiring great delicacy and skill; but when these have been successfully executed, practically perfect vision may be restored, even in very old people, with the assistance of suitable spectacles. It is obvious that the removal of a cataract cannot confer good vision upon an eye which is otherwise damaged by some concurrent malady, such as detachment of the retina, or disease in the optic nerve, and in such cases it is often unjustifiable or useless to operate at all. In young persons the method of operation permits of the extraction of the cataract at any age. In adults after middle life it is usually necessary to wait until the cataract reaches a certain degree of ripeness. The rate of this development varies greatly in different individuals, and is difficult to predict, but operation need rarely be postponed when an otherwise healthy individual can no longer see to read or write. The operation can be performed painlessly under cocaine, and more than 90 per cent. of cases are successful.

Under these circumstances I am rather surprised to learn that in Glasgow alone, out of 828 persons receiving the benefits of the Mission to the Outdoor Blind, no less than 209 are afflicted with cataract, and that among the causes of blindness in 756 persons similarly cared for in six western counties of Scotland, cataract is the assigned reason in 234. The proportion is also high in the Northern Counties district, as well as in that of Fife and Kinross. Admitting that some of these people have cataract complicated by other diseases which render them inoperable, that some have perhaps been operated upon unsuccessfully, and that others have cataract not yet ripe for operation, I cannot help thinking that an expert examiner would classify these cases rather differently, or that some of them might derive benefit from operation, and I venture to suggest that further inquiry into these cases is desirable.

GROUP III. is a comparatively small one. To maintain the proper curvature and form of the eye it is essential that the contents should be fairly constant in quantity so as to secure uniform pressure on the internal surface of the coats of the eye. One of the dangers attending a wound of the eye is that the contents may escape and the eye collapse. Severe inflammation,

whether arising from injury or not, may prevent the proper secretion of aqueous fluid into the eye and lead to shrinkage of the globe. On the other hand, an increase in the bulk of the contents or a blocking of the circulation of fluid on its way out of the eye can lead to a most harmful increase of pressure, to which we apply the term glaucoma. This is usually a very insidious disease, often difficult to diagnose, difficult to prevent, and difficult to cure. I am not surprised to find some cases on your lists.

GROUP IV. is a very large one. If the retina be compared to the vibrating mouthpiece of a private telephone, the optic nerve is the wire which conducts messages to the central station in the brain, where they are recorded, or whence they are redirected as experience or judgment dictates. It is obvious that disease in the retina or optic nerve or in the associated part of the brain may prevent vision partly or totally in eyes which are otherwise correct in form and transparency and tension.

The actual causes are too numerous to mention in detail. Penetrating wounds, crushing injuries to the orbit or skull, the bursting of blood-vessels, deep-seated abscesses, pressure of tumours, and blood-poisonings by kidney disease, by alcohol, tobacco, or lead, &c., may be instanced.

Before I conclude, permit me to express my thanks to several superintendents who have been so good as to supply me, through Mr. Ness, with the alleged causes of blindness in various districts of Scotland. I have refrained from putting these figures before you or treating this subject statistically, for the figures themselves are not always based on expert opinion, and might be misleading. My purpose has been rather to explain to you something of the nature of the maladies which afflict those among whom your kindly work lies, to point out some ways in which blindness may be averted by forethought, and to ask you to spread that knowledge as you have opportunity.

SOME PRACTICAL POINTS IN THE LIFE-HISTORY OF UTERINE FIBROMYOMATA.

By F. W. N. HAULTAIN, M.D., F.R.C.P.,
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WHAT the etiology of uterine fibromyomata is remains a profound mystery, with the natural result that speculation is rife. Whether they are developmental or acquired has yet to be proved; all that can safely be stated is that they practically never manifest themselves before puberty, and seldom commence of themselves to give evidence of their presence after the menopause. From this it would suggest itself that there may be much in ovarian influence, which is supported by the fact that until this is exercised on the uterus they are unknown, and after ovarian activity has ceased they have yet to be proved to develop, while at the same time the frequency of cystic ovarian conditions complicating their presence is undoubted.

To attempt to unravel the mystery is quite beyond the modest intention of this short communication, and I shall therefore confine myself to a few practical deductions derived from a considerable experience concerning the *role* of these tumours during and after the child-bearing period.

As is well known, they seem to occur with equal frequency in the married and single, but a considerable amount of controversy still exists as regards their relation to pregnancy.

Many observers maintain they are a potent cause of sterility, while others would infer that sterility is an undoubted stimulus to their development. My experience, however, is entirely opposed to the latter finding, for the following reasons:—First. Fibromyomata occur in practically equal proportions in married and single women; Second. Fertile women with fibromyomata are relatively sterile for many years before symptoms from the tumours assert themselves.

My statistics from a series of nearly 500 cases in which I have performed hysterectomy or myomectomy show 39 per cent. to be single and 61 per cent. married. Of the married, 42 per cent. were childless, and 40 per cent. of those who had children had but one child, while the average number of children to each was 2.6. The average age of the last child before operation was 8 years. (No widows were included.)

One can reasonably infer from the above that the mere occurrence of marriage has little or nothing to do with their presence, but so far as child-bearing is concerned, fertility is much impaired. In fact, it would point to the distinctly sterilising effect of these tumours, and probably at the same time show that pregnancy has a distinct stimulating effect upon their growth. As is well known, during pregnancy fibromyomata increase in size, and my experience is that they remain larger after its completion.

Doubtless exceptions occur where from uterine contractions they, from want of nourishment, atrophy or are expelled as polypi, but so far as my practice is concerned, this is only an exception which proves the rule.

From this permanent enlargement they commence to develop symptoms, one of the chief of which is sterility, either absolute or indirect, due to the frequency of abortions. In this we must discern the wise provision of Nature, as the presence of fibroids is a complication of pregnancy fraught with much danger.

In a former paper read before the Society I dealt in detail with those cases where from the position and size of the tumours pregnancy and labour were adversely influenced. Although these only formed about 3 per cent. of the cases I have had to perform hysterectomy or myomectomy upon, the difficulties and dangers of the operation were much increased, and showed a mortality of 15 per cent. compared with that of under 2 per cent. in cases not thus complicated.

There can be no question that women with fibroids sufficiently prominent to direct attention to their presence are safer single, and if married, sterile.

The main characteristic of fibromyomata is the frequency with which they undergo degenerative change. In my cases this occurred in 34 per cent.—an experience very much in keeping with the statistics of Noble and other operators.

That this large percentage should obtain, is only in accord with what one would expect when the structure and site of the tumour is considered. As is their wont, fibroids tend to develop an excess of fibrous tissue, and at the same time throughout their substance are poorly supplied with blood-vessels, while their circulation at the best is tedious and difficult. Coincidentally they are subjected to extraordinary variations in vascularity by the continual changes which occur in the uterus during menstruation and pregnancy. (Edema and other congestive conditions are thus prone to be

developed, with subsequent degenerations of a hyaline nature, leading to cyst formation. Malignant or sarcomatous change, on the other hand, in my experience is extremely rare. Twice only have I noted it in my 495 cases. Unfortunately this is not in accord with other observers. Thus Noble states it to occur in 2 per cent. of 2274 collected cases, but he himself has only found it twice in 337 cases. Winter, in 258 cases, has met with it in 4.3 per cent.

Probably this great disparity in frequency is due to the fact that Winter has based his statistics on microscopic evidence, which, taken alone, is of questionable value, for in many cases, which cannot clinically be said to be malignant, numerous embryonic connective tissue cells may be seen simulating sarcomatous tissue. Sarcoma of the uterus is fortunately, from a clinical aspect, an extremely rare disease; on the other hand, if 4 per cent. of fibromyomata thus degenerated, it would be comparatively common. Mere microscopic evidence cannot here be depended on as of much clinical value so far as prognosis is concerned.

Although themselves having a feeble blood-supply, the presence of fibromyomata tends greatly to increase the vascularity of the uterus. In particular is this to be noticed in the cellular bed which surrounds the tumour where the veins are so numerous as to form a distinct plexus. Here it is not uncommon for phlebitis to develop and spread to the veins of the lower limbs. I have met with this condition in an aggravated form in fourteen cases, in nine of which both legs were affected.

In the first three I saw I hesitated to remove the tumour, with the result that the first two had a prolonged invalidism of months' duration. As the third case died from embolism after many weeks of great suffering, I determined in future to operate at once and remove the cause. The result has been satisfactory beyond expectation: in each of the eleven cases I have thus treated, the convalescence has been rapid and the cure complete within six weeks. In three of the cases there was a marked aggravation of the phlebitic symptoms immediately following the operation, but this rapidly diminished. Post-operative phlebitis is an occasional sequel to hysterectomy. I have met with it in nine instances, in each of which the symptoms developed during the second week after the operation. Beyond delaying the convalescence for ten days or so, no untoward result followed.

Perhaps one of the most striking characteristics of fibromyomata is the frequency with which they delay the menopause,

and it is during the development of this phase of life that they are specially liable to undergo degenerative changes. This is doubtless due to the readiness with which they react to the circulatory changes which occur in the uterus at this time—a condition to be expected from the comparatively feeble circulation through these growths under normal circumstances.

The delay of the menopause may be extreme. On one occasion I operated on a patient of 61 in whom it had not been reached, and on five other occasions have noted the same condition after the age of 56.

Quite a diversity of opinion exists, however, as to the course of fibromyomata after the climacteric has been passed. In general it is supposed that they shrink, become atrophic and inert, but there are others who assert that no such salutary change is to be looked for—that they tend to degenerate.

Unfortunately statistics are extremely scant; most authors have tabulated their cases under decades of years, from which it is impossible to derive definite data. Thus, Noble in 287 cases shows 34 operated on between 50 and 60, and 10 cases over 60 years of age. Naturally the bulk of the latter may be said to be post-climacteric, and show a percentage somewhat above my experience.

In 495 cases of hysterectomy and myomectomy for fibroids I have only operated on 6 after the menopause where the indications for their removal was due to the tumour. They are as follows:—1 calcified tumour, which caused painful pelvic pressure symptoms; 1 sarcomatous degeneration of the tumour; 1 twisted uterus (which formed the pedicle), giving rise to peritonitis from strangulation of the growth; 1 fibrocystic degeneration, causing rapid increase in the size; 2 cervical tumours, causing pressure symptoms. On seven occasions I have operated on cases of fibroid for post-climacteric hæmorrhage due to secondary growths of the uterine mucosa, 4 of which were malignant and 3 benign.

The aggregate, therefore, of 13 in 495 cases forms less than 3 per cent., and in less than half of these was the trouble due to the fibromyoma.

In Ward 36 of the Royal Infirmary, to whose case records I obtained access through the kindness of Dr. Brewis, only 3 cases are mentioned in the last five years: 1 a cervical tumour; 1 pressure, though tumour smaller; 1 malignancy of endometrium. Such statistics go far to show that after the menopause the

tendency of fibroids is towards atrophy and quiescence, and this is strongly supported by my experience and that of others from the knowledge of many cases where fibroids were known to exist and give rise to trouble before the change of life, and are now quiescent and innocuous. One is fortunate, from the statistician's aspect, in being able to observe such cases, from the fact that until comparatively recently removal of these tumours was far too grave an operation to undertake unless under desperate circumstances, and thus many who have passed through a long period of invalidism are enjoying a restful old age.

Fortunately, from the patient's aspect, the safety of the operation now will render further statistics of this nature more difficult to acquire. It is, however, unnecessary, as it may be accepted that the effect of the menopause on fibromyomata is, in the main, salutary.

If it be true, as shown from post-mortem statistics (Bayle), that 1 in 5 women have fibroid nodules in their uterus, in a very small proportion must they grow to any dimensions or assume characters of a morbid type. Fibromyomata may thus be considered in the main as harmless growths, which only demand attention when they give rise to symptoms.

There are many writers who look upon them from an entirely different aspect, and recommend their removal whenever recognised under all circumstances as dangerous.

With this view I am entirely at variance, as from what I have shown in the foregoing pages it must be evident that not only do but a small proportion of fibroids give rise to symptoms, but when they arise there is plenty of time in practically all cases to treat them successfully. Malignancy is an exception, and sudden dangers very rare.

On the other hand, when symptoms develop, no one can more wholeheartedly support their removal than I do.

To wait on the menopause is, as has been shown, too indefinite, and even then no sinecure as regards safety.

The risk of operation is now so small that it is folly to undergo years of invalidism for a problematical healthy old age. Yet small as the risk may be, it seems to me still greater folly to undergo it on the still more problematical chance of an innocuous quiescent growth becoming active or malignant.

Sufficient unto the day is the evil thereof; a 2 per cent. risk is worth running when benefit is to be attained, but not on the chance of avoiding possible trouble. One might with greater

propriety advocate the removal of the normal appendix than a small innocuous uterine fibroid, as the chances of future trouble are not only as great, but when they do occur are much more dangerous and urgent.

From the foregoing, one may legitimately form the following conclusions:—(1) Fibromyomata of the uterus are extremely common; (2) only a small proportion give rise to morbid symptoms; (3) they tend to cause sterility; (4) they are particularly liable to degeneracy, though seldom of a malignant type from a clinical aspect; (5) degeneration is specially prone to occur at the menopause; (6) after the menopause atrophy and quiescence is the usual sequence; (7) when symptoms occur, removal is the proper treatment; (8) when small and innocuous, no surgical treatment is called for.

CLINICAL RECORDS.

**URETERAL CALCULUS REMOVED BY THE
TRANSPERITONEAL OPERATION.**

By ALEXIS THOMSON, M.D., F.R.C.S.,
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THE patient, a man aged 25, an insurance agent, was admitted to the Royal Infirmary on the 8th of January 1910, on the recommendation of Dr. Hunter of Leven. His record is a very healthy one, and his occupation entails a great deal of exercise in the open air. During the last eight months he has had fourteen attacks of severe abdominal pain. According to his own account, the pain is first felt a little above the outer half of Poupart's ligament on the left side, then it extends up to the back below the twelfth rib and downwards into the thigh close to the scrotum. The attacks come on without cause and without warning, usually when he is out walking, and the pain is usually severe enough to necessitate his being driven home. About an hour after the onset of the pain he feels sick and vomits, and is chilly to the extent of shivering. During the attack he feels inclined to make water frequently, and has great pain and difficulty in doing so, and the urine appears dark and concentrated. The attacks last about twelve hours as a rule, and have rather increased than diminished in severity.

On examination no tenderness was found either in the region of the kidney or along the ureter, and rectal examination was negative. Red blood corpuscles are easily demonstrated in the urine. A skiagram by Dr. Edmund Price showed distinctly a small stone in the left ureter about two inches above its termination in the bladder.

He was operated upon on the 25th of January. He was placed in the Trendelenburg position, and the abdomen was opened in the middle line, below the umbilicus. After the intestines had been displaced and packed off, the right ureter was readily seen throughout its course. The left ureter was not recognised until the sigmoid was displaced towards the middle line, and the outer layer of its mesentery divided in the line of the ureter. It was looped up on a strand of catgut and traced downwards with the fingers, the whole hand being introduced into the pelvis. The stone, a very tiny one, was found a little more than an inch above the point where the ureter enters the bladder, and owing to its nodular surface, which was not recognisable in the skiagram, great difficulty was experienced in displacing it upwards to the accessible portion of the ureter above the brim of the pelvis.

The ureter was then brought out at the wound, packed off and incised: one or two drops of urine escaped during the removal of the stone. The ureteral wound was closed by a double tier of sutures, which did not enter the mucous membrane. The opening in the meso-colon was then closed with silk, and the abdominal wound sutured without drainage. The urine was tinged with blood for three days after the operation.

His recovery was uneventful, and when shown at the Medico-Chirurgical Society on the 25th of May he was in the best of health.

In all respects the operation by the transperitoneal method was more satisfactory than those previously performed by the writer by the retroperitoneal route. In the female the operation would be still easier, as the intra-pelvic portion of the ureter would be more accessible to the fingers.

A LARGE TUMOUR IN A GIRL AGED FIVE AND A HALF YEARS—NEPHRECTOMY—RECOVERY.

By DAVID WALLACE, C.M.G., F.R.C.S.

Surgeon, Royal Infirmary, Edinburgh.

V. R., aged 5½ years, was admitted into the Infirmary in the end of January 1910. She was thin but not emaciated, and her abdomen was enormously enlarged. The enlargement was chiefly on the right of the middle line, and on palpation an irregular but smooth tumour was readily detected to be the cause. It occupied the right hypochondriac, lumbar, and iliac regions, and extended well beyond the middle line, especially at the upper part. Fluctuation was absent, and percussion gave a dull note throughout. It seemed as if the abdominal contents were wholly pushed over to the left. There were no abnormal constituents in the urine, and the condition did not urgently interfere with the child's health. The tumour was believed to be a renal tumour, and operation was advised, but to this the child's mother did not consent, and took her home. Three months later the girl was re-admitted for operation. No decided change had occurred in the tumour either as regarded size or consistency, but the child was paler and thinner than before. The heart was displaced a little upwards, the pulse varied from 112 to 120, the temperature was irregular, varying from 97° to 100° F., respirations 28 per minute. The urine was normal.

Operation.—On 1st May, under open ether, with, later, oxygen inhalation, the tumour was removed. A vertical incision from the costal margin to nearly Poupart's ligament, immediately to the right of the mesial plane, was first made, and then from it a transverse

incision towards the right lumbar region. The tumour was retro-peritoneal, with the caecum, ascending colon, and hepatic flexure all pushed to the left, so that they lay along its inner margin. The peritoneum was divided vertically, and the above structures separated from the tumour. The vena cava was found greatly broadened out at the inner edge, and had to be carefully separated from the capsule of the tumour, but when this was done there was little difficulty in removing the tumour along with the kidney, which was closely apposed to its outer and posterior aspect. The whole procedure occupied rather less than half an hour, and, fortunately, very little blood was lost, but considerable shock resulted. Two ounces of saline were given by the bowel every hour for twenty-four hours, and the patient gradually rallied and made an uneventful recovery.

When seen on 16th June 1910 the little girl was fat and healthy, and no sign of any return of the tumour could be detected.

The tumour removed weighed 4 lbs. 13 ozs., and was about the size of a football. It consisted of very soft, almost semi-fluid, material, which, microscopically, was epithelial in type. The tissues varied in character, but no tissue of a definite organ was detected. The kidney was flattened out over the tumour, but the tumour did not seem to grow from it. Whether it originated in the suprarenal body or not could not be determined.

The tumour is an interesting one, but the case seems to me chiefly of value in showing that such large growths can be removed successfully. The great danger is shock, which, however, can be minimised by (1) the use of "open ether" anaesthesia, and (2) rapid operation. In the after-treatment I believe the use of saline by the bowel to be of the first importance, and where possible it should be given by continuous proctoclysis.

CASE OF CALCULUS OF THE BLADDER REMOVED BY SUPRAPUBIC CYSTOTOMY IN A GIRL, *ÆT.* NINE.

By ALEXANDER MILES, F.R.C.S.,
Surgeon, The Royal Infirmary.

CALCULUS of the bladder in young girls is sufficiently rare to warrant the publication of the following case:—

The patient, an under-developed and poorly nourished child of nine, was admitted to my wards in the Royal Infirmary on the recommendation of Dr. William M'Connell of Blackridge in February of this year. Her mother informed us that four years previously she had observed that for a time the child had complained of pain before micturition, that the act was attended with considerable straining, and

that the urine frequently contained a quantity of "humour." There was also complaint of pain before defæcation. On examining the child locally one evening, she discovered the end of an ordinary sewing-needle projecting from the vagina, and on withdrawing it there was some bleeding. After this the symptoms passed off completely, and the incident was almost forgotten. The mother had no idea how the needle came to be there, nor could any information be elicited from the child.

About six months ago micturition again became painful, but now the pain was during the act and ceased immediately the bladder had been emptied. A few weeks later the child began to pass water very frequently and soon lost all control of the bladder, so that there was continuous dribbling day and night. The urine contained pus and blood, and had an offensive odour. About this time she began to complain of a constant pain in the lower part of the abdomen, a little below and to the left of the umbilicus. As time went on, she had frequent and severe spasms of pain, which caused her to cry out and draw up her legs. She perspired freely during the attacks, and was greatly exhausted by them. Defæcation was attended with a prolapse of the mucous membrane of the rectum about two inches in length.

These symptoms persisted till the patient entered hospital. The abdomen was prominent and distended, and this, together with the extreme degree of emaciation and the general appearance of the child, suggested the possibility of tuberculous peritonitis, but a von Pirquet's reaction was negative, and there was no history of tuberculous disease in the family. The temperature varied from 97 to 99·6° F., the pulse from 108 to 112, and the respirations from 24 to 28. The urine, when collected, was found to be alkaline in reaction and to contain pus and blood. It also contained numerous cocci and bacilli of the colon group.

No palpable swelling could be detected in the abdomen where she complained of pain, but marked tenderness was elicited on making deep pressure there. There was no enlargement of the kidney on either side. Rectal examination revealed nothing in the bladder.

In view of the history of the passage of the needle four years before, the presence of a foreign body in the bladder was suspected, and an X-ray photograph taken by Dr. Dawson Turner revealed a large calculus situated in the left half of the bladder (Fig. 1).

On the 4th of March the stone (Fig. 2) was removed by suprapubic cystotomy. Irregularly oval in shape, it weighed 324 grs., and was composed of urates and phosphates. In the radiograph taken before operation, a deep shadow in the centre suggested the presence of a bent pin as a nucleus, but another X-ray photograph (Fig. 3) of the stone taken after removal showed that this appearance

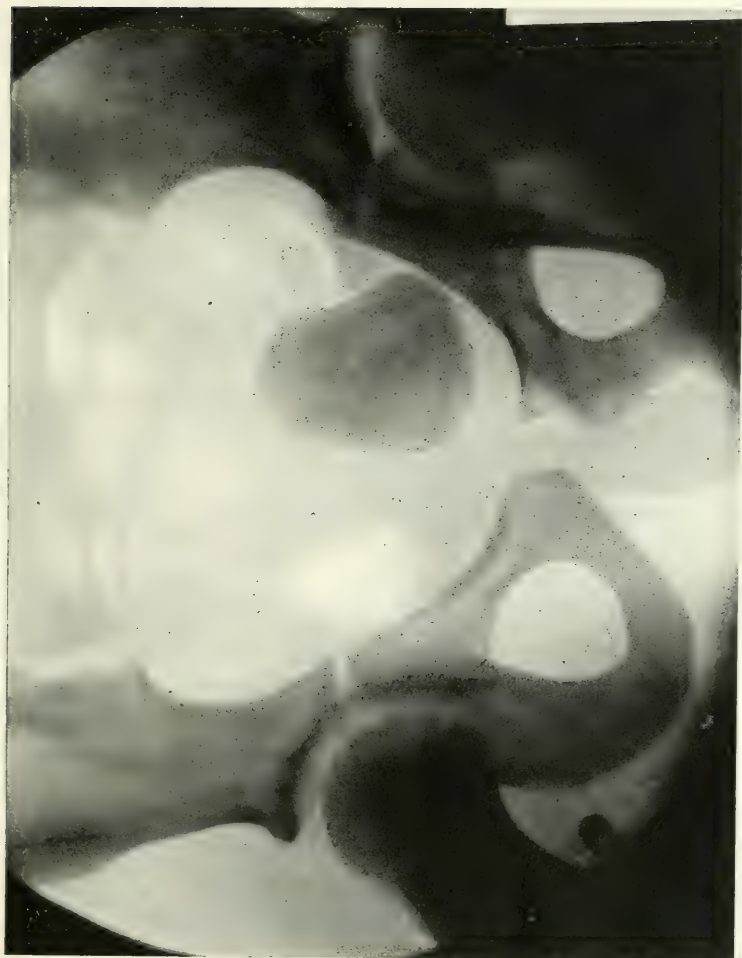


FIG. 1. Radiogram of calculus in bladder of girl, *ad.* 9.



FIG. 2.—Stone: Actual size.

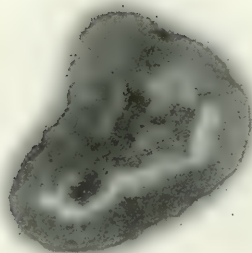


FIG. 3. Radiogram of stone after removal.

was accidental. Syphon drainage was applied for ten days through the suprapubic wound by Mr. Caird's adaptation of Bunsen's bottles. The patient was allowed out of bed on the eighteenth day, and the next day she passed six ounces of urine by the urethra. The following day she passed more, and a few days later the suprapubic sinus had healed. She left hospital on the 2nd of April, free of pain and greatly improved in health.

REPORTS OF SOME SELECT CASES OF ABDOMINAL SECTION IN GYNÆCOLOGICAL PRACTICE.

By JAMES OLIVER, M.D., F.R.S.(Edin.), F.L.S.

(1) PANHYSTERECTOMY FOR COTYLEDONOUS-LIKE ADENOMATA IN THE UTERUS.

THE patient is 34 and single. She began to menstruate at the age of 18, and since the age of 22 she has had attacks of "flooding" occasionally. Often the menstrual discharge has persisted for 6 weeks. She has never experienced any dysmenorrhœa. For years she has complained of leucorrhœal discharge.

Physical Signs.—In the hypogastrium is felt a small globular swelling, which extends out of the pelvis to $2\frac{1}{2}$ inches above the pubes. The hymen is intact. Hanging from the cervix is a small mucous polypus. The hypogastric swelling is the enlarged uterus.

First Operation.—The cervix was dilated. Each dilator as it passed into the cavity of the uterus detached pieces of new growth, which appeared to be similar in structure to the polypus that was observed hanging from the cervix. A large amount of adenomatous-looking material was easily removed by the curette. The uterine cavity measured 5 inches. Under the microscope, sections of the removed growth presented the characters of an ordinary glandular neoplasm. After the curettage, however, there was such a continuous and profuse serous discharge that I advised total extirpation of the uterus.

Second Operation.—The entire uterus was removed by the abdominal route. The ovaries were preserved. The uterus weighed 28 ounces. The cavity of the uterus, when exposed, was everywhere noduled, and presented an appearance resembling closely the interior of the cornua uteri of the goat or sheep. The endometrium was studded with cotyledonous-looking processes,

varying in size from a small grape to a large walnut, and these eventually were found to be glandular neoplasms, which were infiltrating the muscular structure of the organ. Here and there the muscular tissue was greatly hypertrophied, and measured from $\frac{3}{4}$ of an inch to 1 inch in thickness.

(2) PANHYSTERECTOMY FOR DECIDUOMA MALIGNUM OF THE UTERUS.

The patient is 45, and has been married 26 years. She has had 14 children and 2 miscarriages. The last miscarriage—a 3½ months' pregnancy—occurred 3 months ago. Since the miscarriage she has lost continuously and sometimes very freely. She has no pain. Curettage revealed the presence at the left fundus of a small cartilaginous-like growth, which I concluded was epithelial in character, and I consequently advised total extirpation of the uterus.

The uterus (with ovaries and tubes) was removed by the abdominal route.

Description of the Uterus.—The cavity measures 3 inches in length. The peritoneum covering the uterus is normal in appearance. At the left fundus is a nodule the size of a walnut, which is hard and presents on section a reddish appearance. It is incorporated in the uterine wall. Under the microscope, sections of the neoplasm show the uterine wall infiltrated by small round cells, amongst which are large masses of multinucleated protoplasm, together with large cells which present the characteristics of decidual cells.

(3) PANHYSTERECTOMY FOR A MULTICYSTIC GROWTH IN THE UTERINE WALL—CHARACTER OF THE GROWTH DOUBTFUL.

The patient is 51, and has been married 28 years. She has had 10 children and 3 miscarriages. The last pregnancy resulted in a full-time child, which was born 8 years ago. For 10 months she has been losing continuously. Prior to that she had been quite regular and had been losing as usual. Since the hemorrhagic discharge started she has complained more or less of pain in the lower abdomen and back, but this has never been severe.

Physical Signs.—The patient is extra stout, but careful palpation of the abdomen reveals nothing of note. The cervix uteri, which is healthy, is flush with the vaginal roof. Bimanually

the body of the uterus, which is the size of a cocoa-nut, is felt in front.

The uterus was removed by the abdominal route.

Description of the Uterus.—The peritoneal covering of the organ is normal in appearance. The sound gives the internal measurement of the uterus as $4\frac{1}{2}$ inches. The fundal cavity was found to be occupied by a brownish ragged and friable mass, containing thin-walled cysts. The size of the cysts varied from that of a millet seed to a grape. Many of the cysts were stalked at both poles. The uterine wall is from $\frac{1}{2}$ inch to 1 inch in thickness, and the uterine arteries are dilated and thickened.

Under the microscope, sections of the growth show fibrin in layers, with small-celled inflammatory infiltration between the layers.

It is difficult to believe that the cystic mass was a product of conception.

According to the Koran, a woman is incapable of becoming a mother after she has reached the age of 53, and on this important point our legal authorities accept this dogma and refuse to admit that a woman can conceive after the age of 52. To this finding I would add no valid objection can be raised. A scrutiny of the clinical records of 1000 patients who had cause to consult me after the menopause shows that in no case was there any evidence that impregnation had occurred after the age of 47, and that it only very exceptionally happens that a woman conceives after the age of 44.

(4) HYSTERECTOMY FOR FIBROMYOMA; TUMOUR ALMOST DIFFLUENT FROM SO-CALLED RED DEGENERATION.

The patient is 37, and has been married 12 years. She has had 3 children and 1 miscarriage. The last pregnancy resulted in a full-time child, which was born $4\frac{1}{2}$ years ago. During the last 12 months the menstrual discharge, although recurring regularly, has been double and treble what it used to be, and for 6 weeks now she has been losing continuously. Six weeks ago she was seized with severe pain in the lower part of the back, and the menstrual discharge made its appearance although she had been unwell only the week before. At the onset of this attack the body temperature ran up to 103° F., and even now, after more or less fever during a period of 6 weeks, the evening temperature is 100° F. and the morning temperature 99° F.

Physical Signs.—The lower abdomen is occupied centrally by a

globular swelling which extends from the pelvis to about 1 inch below the umbilicus. It is not specially tender to the touch. The cervix uteri is healthy, and the abdominal tumour is the enlarged uterus.

The uterus was removed by supravaginal hysterectomy. The ovaries were preserved. The uterus, which was of about the size of a 3½ months' pregnancy, contained a fibroid which had developed in the right half of the organ, and there was a marked bulging of the endometrium overlying the neoplasm. On cutting into the tumour it was quite soft and diffuent, so diffuent that by incising the bulging endometrium the neoplasm could have been emptied through the cavity of the uterus.

(5) HYSTERECTOMY FOR ADENOMYOMA OF THE UTERUS WITH CYSTIC DEGENERATION.

The patient is 37, and a widow. She has had 2 children, and the last was born 12 years ago. Menstruation recurs regularly, and the discharge usually continues for 3 days. It has never been excessive, and during the last 6 months it has been scanty. For 5 or 6 months she has remarked that her abdomen was increasing in size, and for 3 months she has complained of pain in the left lower abdomen and left loin.

Physical Signs.—The lower abdomen is occupied centrally by a globular swelling which extends from the pelvis to the level of the umbilicus. The cervix uteri is healthy, and the abdominal swelling is the enlarged uterus.

The uterus was removed by supravaginal hysterectomy. The ovaries were preserved. In the posterior wall of the uterus was a cavity containing rather more than half a pint of straw-coloured serum. In the left anterior wall was an elongated sausage-shaped cavity traversed by reticulations of myomatous tissue. This cavity, which could have held an ounce and a half of fluid, contained very little serum. In the right anterior wall was an oedematous adenoma the size of an orange. The two cavities were proved by the microscope to be lined with tessellated epithelium.

(6) HYSTERECTOMY AFTER THE MENOPAUSE FOR ADENOMYOMA OF THE UTERUS WITH TWO LARGE CYSTS.

The patient is 46, and has been married 21 years. She has had 1 child only and this was born 19 years ago. Menstruation has usually lasted 4 days, and she was last unwell 5 months ago.

Six weeks ago she experienced difficulty in passing water, and during the last 8 days she has on 2 separate days been unable to pass it, and the bladder has had to be emptied by catheter.

Physical Signs.—The left iliac and the left hypogastric region is occupied by a small globular swelling which pushes forward the anterior abdominal wall in these regions. On deep pressure in the right hypogastric and right iliac regions there is felt an extension of the tumour. The cervix uteri, which is drawn much up, is located anteriorly and toward the right half of the pelvis. Douglas's pouch is occupied by a firm globular swelling which depresses the vaginal roof, and posteriorly it is impossible to differentiate the swelling from the posterior vaginal wall. The swelling in Douglas's pouch is continuous with the abdominal swelling, and the whole is the enlarged uterus.

The uterus (with both ovaries) was removed supravaginally. In the posterior wall of the uterus was a cavity which contained 15 ounces of straw-coloured serum, and in the right anterior wall was another cavity which contained 8 ounces of the same kind of fluid. Both cavities were smooth and were lined with tessellated epithelium.

(7) ENUCLEATION OF AN (EDEMATOUS FIBROMYOMA FROM THE RIGHT BROAD LIGAMENT WHICH WAS INDEPENDENT OF THE UTERUS.

The patient is 30, and has been married 11 years. She has had 4 children and 3 miscarriages. The last pregnancy resulted in a 3½ months' miscarriage, and this took place 12 months ago. After this miscarriage menstruation recurred regularly and as usual until 38 days ago, when, having gone 10 days over her usual time for being unwell, a hæmorrhagic discharge made its appearance, and this discharge has continued without cessation since it first made its appearance. For 35 days she has complained of pain in the lower abdomen and back.

Physical Signs.—The anterior abdominal wall in the right hypogastric and right iliac region is pushed slightly forward by a small globular swelling which appears to contain fluid. It is not very tender to the touch, and the percussion-note over it is dull. The cervix uteri stands out rigidly from the vaginal roof, and the os is patulous. The body of the uterus cannot be clearly defined, but it appears to lie in front toward the left side. The vaginal roof on the right side is depressed by a portion of the abdominal swelling. The base of this swelling is slightly irregular

and a large artery courses it. The consistence of the swelling resembles that of old blood clot. I considered the case one of ectopic pregnancy, and advised operation.

On opening the abdomen the intestines were extensively and firmly adherent to the right broad ligament and to the side of the uterus. After separating these the tumour was found to be distinct from the uterus and located in the substance of the right broad ligament. The right ovary, the right Fallopian tube, and the right round ligament were clearly discernible. The tumour, an oedematous fibromyoma the size of a large cocoa-nut, was shelled out of the right broad ligament, and the cavity thereafter was closed with deep and peritoneal catgut sutures.

(8) CHYLOUS ASCITES, WITH MALIGNANT DISEASE OF
BOTH OVARIES.

The patient is 39, and has been married 8 years. She has had 2 children, and the last was born 5 years ago. Menstruation recurred regularly until 4 months ago, since which time there has been complete amenorrhœa. For 4 months she has complained of severe pain in the abdomen—especially in the left half—and of pain in passing water.

Physical Signs.—The abdomen is distended, and presents the ordinary signs of ascitic distension. In Douglas's pouch is felt a hard irregular swelling.

On opening the abdomen there escaped altogether about a gallon and a half of milky-looking fluid. This milky appearance was found to be due to the presence of fat globules. The omentum was greatly thickened and irregularly infiltrated by malignant growths. The mesentery and the visceral peritoneum of all the abdominal and pelvic organs as well as the parietal peritoneum was studded with malignant nodules. Both ovaries were malignant, and these no doubt were the seat of the primary disease. A microscopic section of a peritoneal nodule showed the appearance of a spheroidal-celled carcinoma.

The urine in this case both before and after operation never exceeded 16 ounces in the 24 hours.

MEETINGS OF SOCIETIES.

Edinburgh Obstetrical Society.

THE sixth meeting of the session was held on 11th May, Dr. Haultain, President, in the chair.

Specimens were shown by Dr. Haig Ferguson, Dr. Barbour, and Dr. Keay.

Professor Kynoch read a paper "On a Suprapubic Transverse Fascial Incision in Gynæcological Cœliotomy."

Referring to the methods of opening the abdomen that had been proposed with a view to avoid the risk of subsequent hernia, he said the advantage of vaginal cœliotomy was found to be more than counter-balanced by the limited working space it gave. The linea alba, although the weakest part of the abdominal wall to support the viscera, was still the favoured route—doubtless on account of its sparse vascular and nerve supply. Improved technique had greatly diminished the occurrence of hernia. The adoption of an extra-median incision along the linea semilunaris had been shown to lead sometimes to atrophy of the rectus muscle in consequence of divided intercostal nerves, a condition favouring the development of hernia. After defining an efficient cicatrix as one in which fascia weakened by incision should be supported by intact muscle, and should permit of free movement of each separate parietal layer, Professor Kynoch referred to attempts in this direction by Lemander (1893), Wallace of Liverpool, Rappin of Lausanne (1896), and Küstner. Pfannenstiel, improving upon Küstner's method of transverse incision, adopted the following procedure:—About 6 cm. above the pubes a slightly curved incision 6 to 8 cm. long was made through skin, subcutaneous tissues, and anterior sheath of both recti muscles. The anterior sheaths were then bluntly dissected up from their attachment to the recti muscles. The attachment to the linea alba, which now appeared as a prominent ridge, being divided with scissors, the linea alba was then divided vertically and the abdomen opened in the usual way. In closing the wound the peritoneum, recti, fascia, and skin layers were united with continuous sutures, although latterly Pfannenstiel closed the skin and fascial layers by a figure-of-8 silkworm gut suture. In such an incision the transverse fascial wound was protected by intact muscle, no nerves were divided, and consequently no muscular atrophy could occur, so that unimpaired muscle protected the divided fascia. Hernia was only possible at the one point where the transverse fascial incision was crossed by the vertical incision between the recti, and this could in large measure be avoided by suturing together the muscles at that point.

Advantages claimed for a transverse fascial incision were (1) and

chiefly, the avoidance of post-operative hernia; (2) good access to the field of operation, especially the lateral and anterior part of the pelvis; (3) the patients could rise sooner than after the ordinary vertical incision—a great advantage in elderly patients.

Pfannenstiel at first limited its use to cases formerly considered suitable for vaginal celiotomy. Amongst the indications were ovarian cysts of moderate size, non-suppurative diseases of the appendages, small fibroid tumours, ventrofixation, and the early stages of ectopic gestation. Cases suspected to be infective were unsuitable.

For the last five years Professor Kynoch had employed Pfannenstiel's incision with slight modification, having first seen it carried out at his Klinik at Giessen. It was almost universally the method employed in German Kliniks, and in many its use was extended to the removal of very large tumours. In twenty cases followed up for at least two years the results had been so far satisfactory, and led him to consider the method in suitable cases an improvement on the usual vertical incision.

Dr. Barbour said he had very limited experience of the method, but thought it must be difficult to get sufficient room. He did not now advocate the wearing of a belt, and he found hernias very exceptional.

Dr. Fordyce had found troublesome and extensive suppuration follow one of his early cases of transverse incision, and found great difficulty in getting sufficient access to the pelvis. He had now practically given it up, and found hernias very rare in cases that permitted of careful suturing in layers. The President said he had also small experience of the transverse method. One's movements were much hampered by its adoption, as the incision could not be freely enlarged. For simple tubal cases and similar conditions it probably offered a slight advantage, but for large tumours the central incision was more practical. Hernias were more common when small incisions were used, probably because of the bruising when attempting too much through a small opening. He still sutured through and through and was quite satisfied with the results, and believed he had no higher percentage of hernias than others who employed layers. He still believed in the efficacy of the belt, and believed it gave benefit and safety to the wound.

In replying, Professor Kynoch said he himself did not employ the transverse method in cases of large swellings, but on the Continent this was largely done. The recti could be very widely drawn apart. He had had no suppuration, but knew it to be very troublesome when it did occur. He agreed that through-and-through sutures were better in very stout patients, but in others he preferred suturing in layers.

Dr. E. Napier Burnett gave a communication on "*Bacillus Coli Infection of Urinary Tract Complicating Pregnancy.*"

The subject of the urinary complications of pregnancy had received

little attention in this country, but much valuable work had been done in regard to it by the foremost continental authorities. The uncertainty of the etiology of the disease had led to great diversity of nomenclature, the condition being designated under such titles as—pyelitis of pregnancy, bacillus coli cystitis, ureteritis, pyelitis, urosepticæmia, urosapræmia, &c. The history of the subject in French and German literature was sketched, reference being made to the researches of Reblaud, 1892; Cader, 1899; Popitz, Albeck, and Schauta. Cases illustrating the disease and the difficulty of diagnosis were given.

CASE I.—Primipara, æt. 24, four months pregnant, seized with acute abdominal pain and rigor. Temp. 103° F. Pulse 106. Constipation. Frequent painful micturition. Great pain and tenderness over M'Burney's point and rigidity of abdominal muscles. Operation for appendicitis recommended by surgeon. Seen by Dr. Burnett, he found still more tenderness when he applied his hand on the posterior aspect of the right kidney region. Considerable abdominal distension was present. Urinary examination showed sp. gr. 1020; small quantity of albumen. Bacteriological report.—Bacillus coli in pure culture with pus cells and epithelial debris. Rectal examination negative. P.V. right ureter thickened and tender. With treatment acute symptoms disappeared in a week; bacilluria persisted for two months. Parturition at full time, and puerperium normal.

CASE II.—IV.-para, æt. 29, pregnant five months, seized with acute pain in "right side at the bottom of her ribs behind." Rigor; temp. 102° F. Pulse 100. Some frequency of micturition. Constipation. Nausea and vomiting. Abdomen slightly distended. The pain caught her breath and hampered her breathing. Case was diagnosed as right basal pleurisy. Seen by Dr. Burnett, pain was still felt, but no signs of pleurisy were heard, and he found the pain to extend well below the costal margin, and marked hyperæsthesia and tenderness over the whole kidney region. Urine showed small sediment of pus; reaction acid. Microscopically, deposit showed pus cells, active leucocytes, and epithelial cells. Bacillus coli was found on bacteriological examination. Patient improved under treatment, but renal tenderness persisted, with occasional exacerbations of pain and bacilluria. Labour was at term. Forceps used. Puerperium normal till tenth day, when white-leg developed first on one and then on other side. A uterine swab gave bacillus coli in abundance. Ultimate recovery was complete.

CASE III.—Primipara, pregnant four months. Took suddenly ill with vomiting and sickness. Rigor and severe abdominal pain with dysuria. Temp. 103° F. to 104° F. Pulse 116. No history of consti-

pation. Marked right-sided area of renal tenderness and considerable abdominal distension. For ten days had remittent temperature with rigors, and gradually developed a general toxic condition, with dry tongue and delirium. Leucocyte count, 25,000 to 30,000 polynuclears. Urine acid, turbid, with abundant flaky material, loaded with pus cells and epithelial debris. Bacteriological report was bacillus coli in pure culture. All treatment, including autogenous vaccination, was unavailing, and on the twelfth day the condition had become so grave that nephrotomy was decided on, but during the preparations labour set in, and she aborted of twins. The acute symptoms at once subsided, and on continued treatment the condition remained in abeyance.

CASE IV. — Primipara, æt. 28, pregnant six months. Acute attack of cystitis twelve months previously, disappearing completely with treatment. Became suddenly seized with acute epigastric pain, with sickness and frequent and painful micturition. Temp. 101° F. Pulse 96. Some abdominal distension. Urine, acid; sp. gr. 1018, with blood, pus, and epithelial cells. Bacillus coli found in pure culture. On third day there was severe pain over right kidney, in which region a wide area of hyperæsthesia was made out. P.V. there was marked tenderness in the trigone area. Medicinal treatment and attention to the bowels caused symptoms to disappear in a week. Patient went to full time and had normal labour and puerperium.

Symptomatology.—Dr. Burnett classified the following types of the disease:—(a) Acute cases; (b) chronic cases; (c) slight or evanescent.

(a) *Acute Cases.*—The disease had been found to occur at any month of pregnancy from the fourth onwards; seemed to be more frequent in first pregnancies. In some, bladder symptoms were prominent, in others there was renal disturbance with few, if any bladder symptoms. Onset was usually sudden, with rigor, high temperature, and diffuse abdominal pain, soon becoming limited to the right renal region. Nausea and vomiting, with furred tongue and constipation were frequent accompaniments. Dysuria was common. Meteorism was usually a late symptom, appearing some days after the onset. Palpation elicited tenderness at one of three sites—(1) the commonest over M'Burney's point; (2) over the bladder; and (3) less frequently, but most characteristic, a wide area in the right kidney region, where there was extreme hyperæsthesia. P.V. one might find bladder tenderness, especially about the trigone, tenderness and thickening of the ureter.

Temperature usually rose with a chill or rigor to about 104° F., falling in the morning to 99° F. or even 97° F., and disappeared usually in a few days or a week after following an intermittent type.

Persistent high temperature after this stage usually indicated involvement of the kidney or other organs by the bacillus, and delirium and symptoms of general poisoning were present.

Pulse-rate 100 to 110 at first became increased if complications supervened.

Urine had no ammoniacal odour, was usually turbid from mucus, flakes of lymph and epithelial and pus cells. Reaction was invariably acid when the bacillus coli was present in pure culture. Albumen in slight quantity was usually present. Hæmaturia was exceptional. The bacillus coli was usually recognised in pure culture either in clumps or in isolated distribution. Blood examination showed the changes characteristic of a secondary anæmia, with marked increase of the polynuclears.

An acute case untreated ran a course of several weeks with a deepening toxæmia and repeated rigors. If the patient did not abort, the renal parenchyma was soon involved, and the condition became one of septicæmia.

(b) In the *chronic* type onset was more insidious, and the symptoms of malaise, irregular temperature, bladder irritation and renal tenderness less pronounced.

(c) *Evanescent cases* were probably more frequent than was supposed, and were characterised by lumbago-like attacks with griping pains and urinary frequency.

After a résumé of the present state of our knowledge of the bacteriology of the bacillus coli, Dr. Burnett dealt with the diagnosis. This had been illustrated by the cases already alluded to. He drew special attention to the following points in the clinical picture:—(1) A rigor with sudden rise of temperature in a pregnant woman in apparent good health. (2) Sudden onset of acute abdominal pain, especially in the right side. (3) Attacks of lumbago during pregnancy. (4) Tenderness in the appendix area, associated with hyperæsthesia in the right renal neighbourhood. (5) Acute abdominal distension. (6) A pregnancy cystitis persisting in spite of the usual treatment. (7) Pyuria in pregnancy.

Under differential diagnosis he referred to appendicitis, acute intestinal obstruction, and other intra-peritoneal affections such as acute cholecystitis, malaria, pneumonia and pleurisy, renal and ureteral calculus.

Dr. Burnett dealt at length with the etiology, discussing the route by which the bacillus gains access to the urinary passages, the relationship between retention of urine and infection, the marked frequency of the infection on the right side, and the influence of pregnancy as a causal factor.

The treatment consisted in rest in bed, attention to the bowels, bland diet and diluent drinks, which was usually sufficient to procure relief in mild cases.

The most efficient drugs were the alkalies, large doses of the citrates and acetates of potassium and sodium frequently causing rapid subsidence of the acute symptoms, and even helping chronic cases. Urotropine had proved unsatisfactory, as had also hermitol in cases of pure bacillus coli infection, but were useful when the infection was a mixed one. Benzoate of soda and salol had not proved as efficient as the alkalies.

The serum treatment had so far not given the writer very encouraging results, although autogenous vaccination had been highly spoken of by some. Kelly and others had recommended douching the kidney pelvis with an antiseptic through a ureteral catheter. Operative treatment included nephrotomy, producing a renal fistula in the loin and interruption of the pregnancy. The amazing improvement that took place in one of the writer's cases after abortion occurred, and the absence of septic uterine complications would lead him in future to recommend interruption of the pregnancy in severe persistent cases in preference to nephrotomy.

In the discussion the President alluded to the valuable nature of the paper on a subject not sufficiently taken up in obstetric circles. He referred to the greater frequency of the condition on the right side as having something in common with the greater frequency of floating kidney on the right side. In bacillus coli cystitis cases of a previously intractable nature he had derived most satisfactory results by the vaccine treatment. Dr. Barbour had seen no cases of the condition during pregnancy, and wondered if it really occurred more frequently in the pregnant than in other conditions. He thought the balance of evidence was against the pregnant uterus being able deleteriously to compress the ureters.

Dr. Church referred to a lady between fifty and sixty with curious neurasthenic symptoms in whom bacilli coli were found in the urine, and were very persistent.

Dr. Fordyce described a typical case of the condition he had attended. He agreed that the bacillus was much more frequently present in female urines than was supposed, without giving rise to any symptoms.

Dr. Burnett briefly replied.

Seventh meeting held on 8th June 1910. Dr. Haultain, President, in the chair.

Specimens were exhibited by the President, Dr. J. W. Ballantyne, and Dr. Fordyce.

Dr. J. W. Keay read a "Short Note on the Treatment of Vomiting following Chloroform Anaesthesia, including the Use of Adrenalin." Regarding the causative factor of post-chloroform vomiting, he said some authorities attributed it to a disturbance of the central nervous

system, others to a local gastric condition. In his opinion, both causes were at work in different degrees in individual cases. For ordinary cases the best treatment was to give nothing by the mouth for twenty-four hours, thirst being assuaged with saline enemata, and the mouth rinsed out with aerated soda water or lemon water, either hot or cold. Sickness tended to be more severe in cases of prolonged anæsthesia. Much saliva and mucus were secreted, and became saturated with chloroform, so that a gastritis was set up in the empty stomach. On recovery of consciousness, vomiting was set up in the effort of the stomach to get rid of the irritant. The treatment for such cases was large draughts of strongly alkaline solutions, aided by counter-irritation over the epigastrium. Bicarbonate of soda in hot water must be given freely by the mouth. This dissolved or loosened the tenacious mucus, which was ejected by vomiting, or passed into the duodenum. The latter process was aided by keeping the patient on her right side, supported by a hard pillow at her back, or by having her raised to a semi-sitting position with a firm pillow under her knees. Hot fomentations or a light poultice were probably the best form of counter-irritant. As a medicinal means of curing the gastritis he recommended a mixture of dilute hydrocyanic acid, bismuth and soda, or, in some cases with foul tongue, powders of rhubarb, bismuth and soda. Morphia increased the sickness, but was sometimes of use in giving the patient a short rest when worn out with painful retching. Scopolamine and morphine, when given as an aid to general anæsthesia, was probably better. Chloretone (10 to 20 grs.) gave varying results. Cocaine had never given the writer good results.

Dealing with the graver forms of vomiting following major gynecological operations, the disturbing condition of gas distension was introduced. This might be associated with intestinal paresis or reversed peristalsis. The pressure on the irritable stomach caused constant nausea or vomiting, and, if reversed peristalsis were present, bile constantly regurgitated into the stomach with persistent vomiting. In most of these cases the vomiting was not only dark from bile staining, but was a coffee-ground vomit from the presence of blood. Its onset was often twelve to twenty-four hours after operation. After a period of apparent well-being with moderate pulse and temperature, and freedom from pain, the signal of danger was given by a rapid rise in the pulse and a high or subnormal temperature. Vomiting set in violently and persistently, the patient became restless or was exhausted, and if not carefully treated the sickness ended fatally in three or four days. The fatal result had by various authorities been ascribed to an acute acetonæmia, but this was not yet finally settled.

In the treatment of such cases saline rectal injections of one pint to one quart every four hours relieved the flatulence, a rectal tube being left in for an hour or so between times. Rubbing the abdomen was

comforting, and turpentine enemata were often beneficial. If violent sickness persisted on the second day, castor oil or magnesium sulphate was given by the mouth. If the bowels did not act in six hours a soap enema would prove effectual. The patient's strength could be sustained by rectal brandy enemata and sips of brandy by the mouth.

When the vomit was hæmorrhagic and resembled beef-tea dregs or coffee-grounds, in addition to the above measures the writer was in the habit of administering by the mouth a solution of adrenalin chloride, $\text{N}^{\circ}\text{v.}$ to $\text{N}^{\circ}\text{x.}$, in a teaspoonful of water. As regards the rationale of this treatment, he suggested that the blood in the stomach was the result of the engorgement of the stomach vessels during the employment of the Trendelenburg position, which subsequently ruptured under the stress of retching. In those cases where the vomit was black from the commencement of vomiting, might it not be that the stomach had been made anæmic by the Trendelenburg position, and small ulcers been eaten out of the mucous membrane by the excessively acid stomach contents as is said to occur in chlorosis, &c.? Whatever the explanation, he had found in a series of such cases that, after washing out the stomach contents by saline draughts, the further passage of blood into the stomach was arrested by the administration of adrenalin, and the cessation of vomiting had followed with remarkable quickness and success. A number of cases strikingly illustrating this were related. In all probability the efficacy of the adrenalin solution was in large measure explained by its contractile action on the muscles of the stomach wall, which stimulated peristalsis and set up rhythmical contractions of the stomach, causing its contents to flow into the duodenum.

Dr. Haig Ferguson emphasised the importance of preparatory treatment as lessening sickness after chloroform. He was much interested in the suggestion of adrenalin, and would give it a trial.

Dr. Lackie referred to the treatment of persistent sickness by blistering the vagus in the neck, which was much in vogue in Eastern countries.

Dr. Haultain did not attach much importance to preparatory treatment, except to have the bowels moved. The great difficulty in bad post-operative vomiting lay in distinguishing intestinal paresis from peritonitis; the rapid distension from paresis helped to distinguish it. He thought adrenalin might certainly do what was required, namely, to get the intestine to work in the right direction. He was in the habit of giving calomel, 2 to 4 grs., and an enema of glycerine and Henry's solution, which was unequalled for removing flatus from a distended abdomen. He had seen the black vomit referred to much oftener before the Trendelenburg position came into vogue.

The President read a communication on "Some Practical Points in the Life-History of Uterine Fibromyomata," which appears on page 133.

Dr. Lamond Lackie read a note on "Two Unusual Cases of Pelvic Abscess." Both were primarily cases of right-sided puerperal parametritis, which went on to pus formation. In the first, the pus burrowed backwards along the posterior part of the iliac fossa, and ultimately burst through the lumbar aponeurosis, and then, turning forward, appeared in the triangle of Petit. In the second, the area of abscess formation was surprisingly limited, for the inflammatory process had been going on for months. The patient suffered very acute pain in the region of the greater sciatic notch. No fluctuation could be made out per vaginam, but there was distinct œdema of the skin on the buttock. On cutting down towards the notch a small quantity of pus escaped, and on passing forceps through it, about half an ounce of pus welled out. Both patients became rapidly well after incision.

Dr. Fordyce referred to similar cases he had met, and remarked upon the rapidity with which these abscesses dried up after opening, without tendency to fistulous formation.

Mr. Scott Carmichael suggested that in Dr. Lackie's case the starting-point of the abscess might have been the iliac glands and not the parametric tissue. They might have arisen there secondary to slight uterine infection.

RECENT LITERATURE.

CRITICAL SUMMARIES AND ABSTRACTS.

MEDICINE.

By JOHN SOUTTAR M'KENDRICK, M.D., F.R.S.E.,

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ON THE EXAMINATION OF THE FÆCES AND ITS CLINICAL SIGNIFICANCE.

(A Summary of Recent Work.)

THE importance of examining the fæces in disease is now generally recognised, and many diseases that previously were undiagnosed have been brought to light by this method alone. It is only, however, within the last ten years that real advance has been made by the invention of new methods of research, commencing with the elaborate treatise of Schmidt and Strassburger, which was published in 1901. This book is still the standard work on the subject, and it describes the scientific methods adopted by the authors in their analysis of the fæces in health

and in disease. Their methods, as well as their views, have been keenly criticised by other clinicians, who found their results at variance with their own, and some of their methods quite beyond the range of the ordinary physician. New methods of observation, however, have replaced with equal delicacy the more complicated ones devised by the authors, and now it is possible for any practitioner, with a reasonable knowledge of chemistry and bacteriology, to employ the tests for himself. At any rate, with the facilities now afforded by the chemical and bacteriological laboratories associated with the more modern hospitals, these tests can be carried out readily by those in charge. No doubt the offensive nature of the excreta has had much to do with the tendency to overlook this particular line of investigation; but this objection need not stand in the way, as the examination can be made by methods that are accompanied by little or no odour. Another objection may be the want of accuracy in the results, owing to the differences in the amount and kind of foodstuffs consumed, the variance in different persons in the amount of intestinal juices secreted, and in the innumerable ways bacteria, which abound in the faeces, may alter the chemical composition of the excreta. These objections are well founded, but are partly overcome by the scientific application of *test meals*, whose composition are accurately known, and by methods devised for estimating the bacterial contents of the bowel. In many instances little information may be gained, and all will agree that the methods give less accurate results than those obtained by the examination of the urine. At the same time diseases may be diagnosed and facts observed that could not be appreciated in any other way. It is possible, as shown by many writers, to differentiate between the diarrhoeas of gastric origin, diarrhoeas due to disorder of the intestinal or pancreatic juices, putrefactive and fermentative dyspepsias, and thus to treat these conditions from a scientific basis.

Hughes has recently discussed this subject, and believes that nervous diarrhoeas, so-called, are due mostly to inflammation of the intestinal tract, the result of chemical changes; and likewise Schmidt believes that many cases of constipation depend, not wholly on muscular or nervous affections of the intestines, but to digestive derangements, owing to too rapid or complete digestion of foods rich in cellulose. In this way little faecal matter is produced, and the process of defecation is thereby hindered. To obviate this he recommended the use of agar-agar, which swells

in the intestine. Substances containing agar-agar as the chief ingredient, regulin, thalaxine, etc., have recently been introduced for the treatment of habitual constipation.

Among many papers that have thrown additional light on this subject might be mentioned at this stage Herter's book on *The Common Bacterial Infections of the Digestive Tract and the Intoxications Arising from Them*, which gives a truer conception of the nature of the bacterial processes in diseases of the digestive tract; Baumstark's article, devised as an easy means of examination of the feces by the practitioner; and mention may be made of Cammidge's papers which deal more especially with the examination of the feces in pancreatic disease, his most recent contribution having appeared while this abstract was being written.

Composition of the feces (Howell)—

Normally the feces consist of indigestible ligaments of meat and cellulose from vegetables; undigested material such as meat, starch and fat; products of intestinal secretion; products of bacterial decomposition; cholesterin; excretion; mucus and epithelial cells; pigment—stercobilin derived from pigment of the bile; inorganic salts; large quantities of micro-organisms; the following gases, CH_4 , CO_2 , H , N and H_2S .

Pathologically the feces may contain an abnormal amount of these normal constituents: blood (visible or occult); pathogenic bacteria; animal parasites and ova; biliary and intestinal concretions.

In all cases, before examination of the feces, a test diet should be given which represents a definite amount of calories. The diet especially used is Adolph Schmidt's diet, which consists of—

Morning.— $\frac{1}{2}$ litre milk or $\frac{1}{2}$ litre cocoa and 50 grms. rusk.

Before Noon.— $\frac{1}{2}$ litre gruel (40 grms. groats), 10 grms. butter, 200 grms. milk, 1 egg and 300 grms. water.

Noon.—125 grms. minced beef (raw inside) in 20 grms. of butter, 190 grms. potatoes mashed with 100 grms. milk and 10 grms. butter.

Afternoon.—Same as morning.

Evening.—Same as forenoon.

Altogether $1\frac{1}{2}$ litres milk, 100 grms. rusk, 2 eggs, 50 grms. butter, 125 grms. minced meat, 190 grms. potatoes, 80 grms. oatmeal.

This represents 2234 calories.

With the diet a little hæmatoxylin or carmine is given as an index of when to examine the feces under this new diet.

For examination purposes the faeces should be passed into a clean vessel and washed, either by stirring up in saline solution and filtering, or by using the specially devised sieve of Boas, whereby a continuous fine stream of water is allowed to flow over the faeces—the smell can be overcome by 5 per cent. phenol solution or a little turpentine.

Before washing the faeces the reaction is taken, the colour noted, and the general appearance and weight observed. Any shreds of mucus, concretions, or animal parasites are observed.

Reaction.—The faeces are usually faintly acid or faintly alkaline or amphoteric. Typhoid and cholera stools are usually alkaline. The stools accompanying a milk or starch diet are usually acid. Cammidge has observed that in pancreatic disease the stools are usually acid: if alkaline, the pancreatic disease is usually associated with biliary obstruction.

Colour.—Normally this varies from a lightish yellow to a brownish-black colour, depending on the character of food taken. The normal pigment is hydrobilirubin or reduced bilirubin (identical with urobilin).

This pigment may be detected thus:—Small piece of fresh faeces is rubbed in a mortar with concentrated watery solution of corrosive sublimate and allowed to stand for several hours. Hydrobilirubin gives a deep red colour (hydrobilirubin-mercury), while bilirubin gives a green colour.

Pathologically the colour is important:—It is golden-yellow from unchanged bilirubin, green from biliverdin or bacteria, and putty coloured from deficient bile, pancreatic disease, and tuberculous peritonitis. Cammidge has observed white stools in pancreatitis with no jaundice or biliary obstruction; but even in these cases hydrobilirubin was present. Von Nencki has shown that hydrobilirubin may be converted by bacteria into a whitish substance "leuco-urobilin."

General Appearance and Weight.—The appearance varies from a soft liquid stool to a hard constipated stool. It may be ribbon-like from stricture of the rectum, or have the appearance of round hard balls from dilatation of the sigmoid and rectum. The weight varies with the diet. On an exclusive meat diet the average weight is 100 to 150 grms., on mixed diet 170 grms., and on vegetable diet 400 to 500 grms.

Mucus.—When mucus appears in any quantity in the stool, this is pathological. If it is intimately mixed with the faeces it comes from the small intestine; if it surrounds the stool it comes

from the large intestine; if wholly mucus it indicates dysentery, ileocolitis or ulceration of the rectum. Large casts may be passed in mucous colitis.

So far, then, inferences may be drawn from the macroscopical appearances and reaction of the faeces; of still greater importance are the microscopical appearances, the chemical analysis and the bacteriological examination.

Microscopical Appearances.—Thin stools are allowed to settle or are centrifugalised; deposit is examined on a slide; a portion of a firmer stool is first rubbed up in a glass mortar with physiological saline solution and then centrifugalised.

Remnants of food are seen, connective tissue, muscle fibres, starch granules and fats.

(a) If there be much connective tissue following the limited supply of meats (100 grms.), then this points to disturbed gastric digestion, since the gastric juices alone can digest connective tissue. Achylia or hypochylia would do this, or excessive peristalsis.

(b) If many muscle fibres be seen with a limited supply of meat in the diet, then this points to disturbance of the function of the small intestine, probably of the pancreatic digestion. If both (a) and (b) are present it can be inferred that the stomach and intestines are both at fault.

(c) Normally a few starch granules are present in the faeces. If they are markedly increased this indicates disturbance in the small intestine, and a diminished digestive power for carbohydrates.

(d) Fat is present normally to extent of 23 per cent. of stools in dry substance. Increase of fats indicates interference with its absorption from the foods, *i.e.* interference with biliary secretion, and disturbance of the intestinal mucosa. Microscopically that is evidenced by increase in sebaceous acid flocculi, neutral fat drops, etc.

Cammidge has found that in all pancreatic diseases the amount of fat is high. It reaches its maximum in malignant disease of the pancreas:—In 38 cases it averaged 71·3 per cent. The average in 52 cases of chronic pancreatitis associated with gall-stones in common duct and jaundice was 56·6 per cent., while in 8 cases of cirrhosis of the pancreas it averaged 36·2 per cent. He observed also the ratio of unsaponified to saponified fats was even of more importance than the total amount of fat.

Normally the amounts of each kind of fat are about equal. In disturbed pancreatic flow there is increased proportion of unsaponified fat; in obstruction to the bile flow there is increased proportion of saponified fat. In cancer of the pancreas and

affections of the bile-duct the amounts are about equal. In 7 cases of disease of bile-duct alone 5 showed excess of saponified fats. In early stages of catarrhal pancreatitis, from increased flow of pancreatic juice, there is usually increase of saponified over unsaponified fats.

It is from the chemical analysis, however, that most information can be gained about the amount of fat in the faeces.

Epithelial cells may be seen.

Squamous cells come from the anal orifice, otherwise little information can be gained.

Occasionally a few red blood corpuscles may be detected, or pus cells, or ova of parasites or various crystalline bodies, such as triple phosphates, calcium phosphate, magnesium phosphate, calcium oxalate, cholesterolin, Charcot-Leyden crystals (suggest intestinal parasites), hæmatoidin crystals.

Baumstark has devised a rapid method of observing the remnants of food stuffs in the faeces. He makes three microscopical preparations:—

1. A small piece of faeces pressed between slide and cover-glass. *Normally*—Muscular fibres, lime salts, sebates of lime, uncoloured soaps, single potato cells empty, remnants of chaff from gruel and remnants of cocoa. *Pathologically*—More muscle fibres and clearer striae, neutral fat drops, sebatic acid and abundant soap, needles, and potato cells, with more or less preserved grains of starch.

2. Faeces rubbed up with a little drop of 30 per cent. acetic acid solution, and held over the flame until it boils. *Normally*—Large lime salts and soap flakes are melted into neutral fat drops. *Pathologically*—Abundant sebatic acid flocculi.

3. Faeces rubbed up with a little drop of a strong solution of iodine in iodide of potassium (I 1 part, KI 2 parts, distilled water 50 parts) and covered. *Normally*—Brown coloured from iodine: the potato cells now violet (not blue). *Pathologically*—Bluish-coloured potato cells, blue or violet sporules or bacterial flora, and fat cells which are yellow from the iodine.

It is, however, in the chemical and bacteriological examination of the faeces more especially that advance has been made, and fresh information gained in obscure diseases.

Chemical Analysis.—For Blood.—Until comparatively recently the presence or absence of blood in the stools was recognised only by the naked eye. The faeces might be streaked with blood, or there might be a profuse hæmorrhage with clots of blood: the

former might be coffee-ground or tarry, depending on the situation and the amount. In such cases microscopically no red corpuscles are found, as they have previously been destroyed in the upper part of the intestinal tract.

Since Boas's researches in 1903, we know the real significance of small hemorrhages, "occult blood," from the gastro-intestinal tract.

Goodman has recently written a paper on the examination of the feces for "occult blood," with special reference to the value of the benzidine test. He first describes the various tests that have been used for recognising blood in the feces—Weber's guaiac test, Rossel's aloin test, etc.—and compares these with the benzidine test of O. and R. Adler. For practical purposes he recommends Schlesinger and Holst's modification of Adler's test, which is:—

(a) Concentrated solution of benzidine is made by using as much benzidine as will go on the end of a knife in about 2 c.c. of glacial acetic acid. The mixture is soluble and should be shaken freely.

(b) A small piece of feces is suspended by stirring in a test tube one-fifth full of water; the test tube is closed with cotton and the feces boiled.

(c) 10 to 12 drops of benzidine solution are poured into a test tube, and 2.5 to 3 c.c. H_2O_2 (3 per cent.) added.

(d) To this are added 1 to 3 drops of the boiled feces, after mixing by slightly shaking.

With blood the colour becomes green, blue-green or blue—the blue being more pronounced if more blood is present. The reaction is present in 1 to 2 minutes. Negative tests show no change even after standing for twenty-four hours.

The guaiac and aloin tests respond to the dilution of 1 in 25,000; the benzidine test responds to the dilution of 1 in 200,000. For traces of blood in the feces, then, this test is to be relied on. The author comes to the following conclusion:—If the benzidine test is negative no occult blood is present, but if it is positive this may mean nothing, unless corroborated by one or both of the other tests. If a positive test is obtained with benzidine the diet and medication must be regulated, as meat and certain chemicals, such as iodide of potassium, give the reaction, as does mucus, pus, iron and copper salts, etc.

Estimation of Fats.—The qualitative test, as devised by Klopstock and Kowarsky, for fats is easy. The feces are mixed with a small quantity of ether and allowed to settle; a small portion of

the ether is withdrawn with a pipette, and a drop allowed to evaporate on a piece of filter paper. A transparent spot, which cannot be washed out with water, remains.

The quantitative estimation of the fats in the faeces is a more complicated process, and various methods have been devised. In 1907, however, Walker Hall emphasised the importance of Hecht's method, which he claims to be easily carried out, and gives accurate results. His method is as follows:—

1. Administer a known quantity of fat in the food.
2. Transfer the entire stools to a mortar, add normal KOH solution, and stir until all lumps have disappeared. Make up to 500 c.cm. with distilled water. Shake well.
3. Take 50 c.cm. and heat for 20 minutes.
4. Add 50 c.cm. of 5 per cent. alcohol. Heat for 20 minutes.
5. Add strong HCl until markedly acid.
6. Heat for 20 minutes, filter, evaporate down to 50 c.cm.
7. Take 20 c.cm. in a Schmidt-Werner tube, and make a Schmidt-Werner estimation. After calculation from the dried residue of the aliquot portion of the ethereal extract multiply by 25.

If the process be stopped at 3 then the amount of fat extracted approximates that of the *fatty acids*. Deduct this from the quantity yielded by the whole process and an approximate amount of the *neutral fats* is given.

Quantitative Estimation of Nitrogen.—This is done by the Kjeldahl method, a description of which is to be found in most physiological text-books.

Quantitative Estimation of Starches.—The test method is the "Fermentation test of Schmidt." After a test meal it is recommended for estimating the efficiency of the digestive apparatus. The form of apparatus is well known. Five c.c. of formed faeces are prepared with sterile water and poured into Strassburger's instrument. The small tube surmounting the bottle is filled with water, the parallel tube remaining empty. If the apparatus is kept at blood-heat for 24 hours, gas will rise and displace the water in the first tube, forcing it into the outer parallel tube. Thus the amount of water displaced is a measure of the amount of gas formed. One-third displacement is pathological.

Estimation of the Gases in the Faeces.—In 1909 Bassler has described an apparatus for the chemical and bacteriological examination of the gastric contents and faeces. The main part of

the apparatus consists of the well-known form of fermentation tube, the upright limb of which has a 15 c.c. capacity, graduated in per cents., and the bulb a 30 c.c. capacity. The tube is less than 6 inches in height, and constructed so that 25 c.c. sufficiently fills the instrument. Faeces (7.5 grms.) are mixed with water (25 c.c.) and run into the instrument. The whole is placed in oven for twenty-four hours at 37° C. The total gas content is observed. By means of a pipette 1 to 2 c.c. of saturated solution of sodium hydrate are introduced to extract the carbon-dioxide gas. The other gases can be collected and tested for by simple means.

Bassler finds that the gases in the faeces vary greatly with the character and amount of food, the character and amount of bacteria present, and the pathological condition of the lower digestive canal.

He finds the percentages of gases in the various diets as follows:—

	Milk. 50 per cent.	Meat. 2 per cent.	Vegetable. 3 per cent.
Hydrogen	37	50	37
Nitrogen	37	50	37
Marsh gas	09	31	50
Carbon dioxide . .	12	10	27

Sulphuretted hydrogen is present in small amounts. After a Schmidt and Strassburger diet he finds normally about 20 per cent. to 30 per cent. of gas. In saccharobutyric putrefaction the gas content is from 5 per cent. to 13 per cent., and in gastro-enteric atrophy it is about 80 per cent. On a meat diet the amount of gas may fall to 15 per cent., while on a strict carbohydrate diet it is usually much higher.

Purin Bodies in the Faeces.—In 1903 Walker Hall describes a method of estimating these bodies, but no special information, at least to the clinician, can be gained by this process.

Bacteriological Examination of the Faeces.—Friedenwald and Leitz have recently written a paper describing the importance of finding out the bacterial content in health and disease, and the effect that various so-called antiseptics have on the bacterial content.

Pasteur was of opinion that bacteria in the intestinal tract were essential to life, and his contention has been supported by the fact that animals fed on sterile food only are weakly, with stunted growth.

Klein and De Lange found that 13 per cent. of dried substance

of the faeces was composed of bacteria. Two years later (1902) Strassburger repeated the experiments and found that former methods and results were unreliable. He weighed a certain quantity of faeces, macerated them in water and centrifugalised. The bacteria remained suspended in the fluid, while the heavy substances fell to the bottom. This was decanted, treated with alcohol and centrifugalised. The bacteria fell to the bottom, and could be collected. The bacteria were dried and weighed. The following conclusions were arrived at:—

1. Under normal conditions $\frac{1}{3}$ of the dried substances of the faeces of a healthy individual, ingesting a medium diet, consists of bacteria.

2. In adults the quantity of daily bacterial waste when dried (*a*) under normal conditions, 8 grms.; (*b*) in dyspeptic conditions, 14 to 20 grms.; (*c*) in chronic constipation, 2·6 to 5·5 grms.

3. In chronic constipation the bacterial substance is usually abnormally small.

4. In infants under normal conditions there is practically the same percentage of bacterial growth as in adults.

5. The total number of bacteria evacuated by a normal individual per day has been estimated as 128,000,000,000.

6. Knowing the quantity of bacteria in the faeces gives an insight into the bacterial development of the whole intestine.

Strassburger believes that the best method of reducing the bacterial growth of the intestine is by means of diet. The value of antiseptics is doubtful. Herter says, "I have found in certain instances that salicylates, aspirin and salol, have excited some action in diminishing the output of indican, but beyond this I have not been able to satisfy myself that the effects of intestinal antiseptics is pronounced."

Dutton Steele found that beta-naphthol and bismuth salicylate did reduce the bacterial growth in the intestines in normal individuals, but he is convinced that "evacuation of the bowels with regulation of the diet are by far the most efficient means at our command to check excessive bacterial activity in the intestines."

Friedenwald and Leitz made a large number of experiments on this point, using Steele's modification of Strassburger's method. Their results were as follows:—

1. *Normal Cases*.—Greatest reduction in the bacterial content was from diet alone.

With liquid diet the reduction was 16 per cent.

With beta-naphthol a reduction of 9·9 per cent.

With bismuth salicylate a reduction of 8·8 per cent.

With aspirin, 4·6 per cent.

With salol, no reduction at all.

2. *Gastro-Intestinal Cases*.—Regulation of diet and evacuation of the bowels was the most effectual method of reducing high bacterial content of the intestines.

Beta-naphthol and bismuth salicylate seem to be the most effective intestinal antiseptics. Otherwise the results in gastro-intestinal cases are similar to those in normal cases.

Dutton Steele noted in one case of achylia a bacterial content of 38 per cent., in a case of hyperchlorhydria one of 28·5 per cent.

Different Organisms in the Faeces.—The greatest number of intestinal micro-organisms belong to the bacterium coli group. In addition there are the bacterium aerogenes, bacterium faecalis alkaligenes and bacterium fluorescens. The most important pathogenic bacteria are the bacilli of typhoid, cholera, dysentery and tubercle: more rarely streptococci and staphylococci, the micro-organisms of anthrax, plague and the bacillus pyocyaneus.

Tubercle Bacilli.—Even though there be undoubted intestinal tuberculosis, Sahli has found that these cannot always be demonstrated in the faeces. They are chiefly found in purulent or bloody pieces of diarrhoeal stools. They can be sometimes demonstrated in solid pieces, if, as Hamburger recommends, a small piece of faeces is mixed with a few centimetres of water, then centrifugalised. The supernatant fluid is diluted with a double volume of alcohol, centrifugalised again, and then, after drying, examined under the microscope, when numerous tubercle bacilli will be seen. Care must be taken to distinguish these from the smegma bacilli, which occur at the anal orifice and become mixed with the faeces.

Fabrizi found tubercle bacilli in the faeces of children when there was no sputa. He believes the best method of detecting the tubercle bacillus in faeces is that of Strassburger, with the additional use of a 20 per cent. solution of antiformin, which has the effect of destroying other bacteria present and leaves the tubercle bacilli unhurt. A small pellet of faeces is dissolved in 15 cm. of water, centrifugalised for 2 to 3 minutes, and then treated with an equal quantity of 20 per cent. antiformin solution for 15 to 20 minutes. To this fresh mixture an equal quantity of absolute alcohol is added, centrifugalised again for 2 minutes, and a microscopic preparation made from the sediment. The faeces of 35

children suffering from tubercle were examined, when a positive result was obtained 11 times. In 9 adults (all tuberculous) the tubercle bacillus was found 7 times in fæces.

On going to press, a paper has just appeared in the *British Medical Journal* by Drs. Philip and Agnes Porter on "Tubercle Bacilli in the Fæces in Tuberculosis." They examined the fæces of 109 persons, 99 of whom had pulmonary tuberculosis, 1 tuberculous peritonitis, and 9 with no tubercular infections. *In no case was there evidence of intestinal tuberculosis.* Of the 100 tuberculous cases, 79 yielded tubercle bacilli, and only 21 were negative. The 9 normal cases yielded no tubercle bacilli. Of the tuberculous patients in which tubercle bacilli were found in the expectoration, every case except one presented tuberculous bacilli in the fæces. In 42 cases with no tuberculous bacilli found in the expectoration, 29 gave tuberculous bacilli in the fæces. In 24 cases with no sputum, 17 showed tuberculous bacilli in the fæces.

Eyre and Minett recently made an investigation in the incidence of Morgan's Bacillus No. I. in the normal fæces of young children. Sixty cases were examined—23 males and 37 females, between the ages of birth and 13 years. Four stains of the Morgan Bacillus No. I. were isolated, or 6·3 per cent.

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SURGERY.

THE VALUE OF MOMBURG'S METHOD OF PROCURING HÆMOSTASIS.

THIS procedure, which consists in winding an elastic cord several times round the waist between the iliac crest and the lower border of the ribs, has now been some two years before the profession, and nearly 200 cases have been published in which it has been employed to control bleeding in operations involving the upper part of the thigh or the pelvis where severe hæmorrhage is expected. The time, therefore, has arrived when it is proper to inquire into the results, and, more particularly, to ask the question—"Is the method a safe one, and is it one to adopt as a routine practice?" A valuable contribution to the subject appears in the *Revue de Chirurgie* (May 1910), by Professor G. Gross and A. Bisset, of Nancy. They also give full details of a fatal case, in which it is almost impossible to doubt that death was directly due to the method. The patient was a woman, æt. 28, suffering from advanced tuberculosis of the knee-joint, with abscesses extending up to the buttock. Hectic fever was present; she was emaciated, and her pulse-rate averaged 110 per minute. On the other hand, minute examination of her heart revealed no murmur, nor were any clinical signs of failure of compensation present. The pulse was always perfectly regular. Gross decided to disarticulate at the hip, choosing Momburg's method, as offering the best chance of saving unnecessary loss of blood. Chloroform was given by an expert, and, after elevating both lower limbs, Gross applied the rubber band himself, passing it slowly four times round the patient's waist. Pulsation in the femorals disappeared. No alteration whatever in the radial pulse took place, or in the patient's appearance. A sphygmographic tracing showed no change. The disarticulation was completed in fifteen minutes, during which time the patient gave the anaesthetist no anxiety, and hæmostasis was perfect. The cord was then *very slowly* removed (in 60 seconds). At the moment when it was com-

pletely freed, sudden pallor, with syncope and cessation of the pulse, occurred, and, in spite of restorative measures persevered with for half an hour, the patient died. At the autopsy no signs of injury produced by the band were found, and all the viscera were practically normal except the heart. It, however, showed definite fatty degeneration and some vegetations on the mitral valve. The most important point, however, was that the right side of the heart was much dilated and distended with blood. Gross had little doubt that in this case death occurred from sudden acute dilatation of the diseased heart, due to its inability to cope with the change in the vascular conditions produced by the removal of the tubing. It is interesting to note that in this case the precaution, usually recommended, of bandaging the legs (or at any rate one leg) does not seem to have been taken. By this means sudden changes in the blood-pressure on removing the tubing are stated to be less likely to occur.

The authors also regret that at the date of their operation the later advice of Momburg to place the patient in the Trendelenburg position was not known. By this Momburg claims that the mesenteric vessels escape compression, and consequently the blood-pressure is less liable to be raised unduly. Verth, however, states that this position increases the tension.

So far Gross's case is the only recorded one in which death was apparently directly due to the method; but the authors consider it not unlikely that unpublished cases exist. In the literature they find, moreover, individual instances of serious after-effects, such as retention of urine, palsy of the rectum and bladder, painful cramps of the legs, localised gangrene of one leg, hæmoptysis, epistaxis, intestinal hæmorrhage, mitral insufficiency for twelve days. Collapse and syncope, however, are the sequelæ most often recorded. In one such case death was only averted by the removal of the band. Normally, a slight increase in the pulse-rate takes place, both on putting on and on taking off the band. Abnormally, the pulse-rate may rise to 120 or even 180. The authors' conclusions are that the method should only be used in very exceptional circumstances, and that three or four minutes should be taken both in putting on and taking off the band.

A. A. SCOT SKIRVING.

CONSERVATIVE TREATMENT IN BONE DISEASES.

At the annual meeting of the American Surgical Association, J. C. Bloodgood read a communication on benign bone cysts (ostitis fibrosa), giant-cell sarcoma, and bone aneurysm (*Surgery, Gynecology and Obstetrics*, June 1910). Of 89 cysts, 69 belonged to the variety of true localised bone cyst or ostitis fibrosa. The remaining 20 comprised cysts in enchondroma, in pure myxoma, in giant-cell sarcoma,

and in otitis deformans, cysts due to subperiosteal ossifying hæmatoma, and callous cysts. Five pathological varieties occurred in the series: medullary cysts without any definite lining; medullary cysts with a connective-tissue lining easily stripped from the bony capsule; medullary mass of fibrous tissue with a small cyst; the same mass without any cyst formation; and multiple medullary cysts. At the operation a thin shell of bone is always found; the contents of the cyst are usually dark brown and thin, but never distinctly hæmorrhagic, as in bone aneurysm. The condition is cured by simple incision and curetting, and it never shows any tendency to malignancy.

The giant-cell sarcoma was easily recognised at the exploratory incision by the soft hæmorrhagic tissue, resembling granulation tissue, mixed with whitish areas. In his own cases and those recorded in the literature, he had been unable to find metastasis from a giant-cell sarcoma. [In this country its benign nature is generally recognised, and it is now called myeloma, in preference to giant-celled or myeloid sarcoma.] The treatment should be removal of the growth by curetting, except in large tumours which have perforated the bone capsule and infiltrated the soft parts, when amputation was indicated.

Bone aneurysm was distinctly malignant, and was due to hæmorrhage occurring in medullary sarcoma. By the time this stage was reached, metastasis had probably occurred, and even high amputation usually failed to cure the condition.

In the discussion on the paper several surgeons described methods for dealing with the large space left after curetting away a myeloma. R. Matas thought Beck's bismuth paste was of great value for filling up cavities, and better than the Moesetig-Moorhof cement, which was apt to produce iodoform poisoning. H. M. Sherman had found most favourable the introduction of salt solution into the cavity just before the last stitches were inserted. Professor A. von Eiselsberg, of Vienna, said he was in the habit of pouring boiling water into these cavities to kill all the germs. W. S. Halsted mentioned a case of myxoma of the humerus, in which operation was followed by implantation recurrences in the soft parts, and this was attributed to infection of the wound, which might have been prevented by pouring in boiling water, or by the use of Paquelin's caутery.

JAMES LOCHHEAD.

NEW OPERATION FOR PROMINENT EARS.

W. H. Luckett draws attention to the fact that "donkey ears" are anatomically deformed as well as set at an abnormal angle to the cranium (*Surgery, Gynecology and Obstetrics*, June 1910). Hence the operations hitherto adopted to rectify the cephalo-auricular angle are

not sufficient to restore the normal contour of the ear. A horizontal section through the auricle, just above the level of the auditory meatus, shows that the cartilage of the concha bends outwards at a right angle from the head until it reaches the antihelix, which it forms by being bent backwards upon itself. In prominent ears, which are characterised by a bending forwards of the auricle, the antihelix is undeveloped or absent, and the concavity of the concha is continuous with the fossa of the helix. In the other class, which is characterised by a drooping of the upper part of the auricle, the concavity of the concha is continuous with the fossa triangularis and the fossa of the helix, both the ridges of the crura of the antihelix being absent. In less extreme degrees of drooping ears only the upper of these two ridges may be absent.

The antihelix and its crura are produced simply by a folding of the cartilage, and the new operation is for the purpose of reconstructing this fold, at the same time altering the cephalo-auricular angle. On the posterior surface of the auricle a crescentic flap of skin is mapped out by an incision, and removed. A similar segment is removed from the cartilage, and the latter is sutured, as in the Lembert method of suturing intestine, so that the flat surfaces of the cartilage are brought into apposition. The skin edges are then brought together with horse hair. Care must be taken not to button-hole the skin anteriorly, and to avoid septic perichondritis and a hæmatoma. In cases in which the cartilage is thin and flexible, it may merely be folded and stitched in position.

JAMES LOCHHEAD.

PAIN ON REMOVAL OF PRESSURE IN APPENDICITIS AND PERITONITIS.

Blumberg (*Berl. klin. Wochenschr.*, 24th January 1910) describes what he considers to be a very important clinical test in differentiating a catarrhal appendicitis from an inflamed appendix with peritonitis. The symptom is elicited by pressing with the hand over the appendix region, and then suddenly removing the hand. The pressure will elicit pain if the appendix be inflamed, whether there be peritonitis or not, but pain caused by the sudden removal of the palpating hand is found only when peritonitis is present. The explanation of the sign is that the elastic rebound of the abdominal wall when the pressure is suddenly removed causes inflamed peritoneal surfaces to jar on each other, the patient experiencing a sudden pain.

After an extended trial the writer has found this to be the most reliable symptom in diagnosing early cases of peritonitis, and has frequently found it present where other signs were absent.

The test is useful in all cases of peritonitis, whatever be the source,

and it is generally elicited to the most marked degree over the source of the peritoneal infection.

Cases are cited where a diffuse peritonitis, involving the lower half of the abdomen, was diagnosed through finding this test positive on the left as well as on the right side of the abdomen, although the tenderness on pressure was confined to the right iliac region. It has been repeatedly noted, moreover, that where the peritoneal inflammation round an appendix is subsiding, the pain on the sudden removal of pressure disappears earlier than does the tenderness on pressure.

D. P. D. WILKIE.

MALIGNANT DEGENERATION OF CHRONIC GASTRIC ULCER.

Hauser (*Munch. med. Wochenschr.*, 7th June 1910) records a case where, in a woman aged 63, the diagnosis of carcinoma of the pylorus had been made; a tumour was palpable in the epigastric region, and a test meal revealed the total absence of hydrochloric acid. Whilst in hospital she was suddenly seized with abdominal pain, developed the signs of general peritonitis, and died within twelve hours of the onset of the acute symptoms. At the sectio there was found a well-marked scirrhus cancer of the pylorus and lesser curvature of the stomach, and alongside this a recent peptic ulcer, which had perforated and led to peritonitis. In several parts of the malignant growth also there were superficial areas of necrosis, and, situated under these, zones of inflammatory infiltration. In this case there could be no doubt that the cancerous growth was the primary condition, and that the peptic ulceration was a secondary and, indeed, a very late development.

Whilst Hauser firmly believes that carcinoma of the stomach very frequently starts in an old peptic ulcer, he yet emphasises the difficulty there may be in deciding from naked eye or from microscopic examination which was the primary condition.

D. P. D. WILKIE.

EXTRA-MUCOUS PYLOROPLASTY.

The operation of pyloroplasty has of recent years been almost entirely abandoned in favour of gastro-enterostomy. Kausch (*Berl. klin. Wochenschr.*, No. 21, 1910) believes that it may with advantage be performed in certain cases of pyloric stenosis, and particularly in cases of pyloric spasm, and in cases of moderate muscular hypertrophic stenoses. The operation he advocates is one in which the mucous membrane is not divided, but in which the muscular coats are severed either subperitoneally, by means of a fine tenotome, or by open incision down to the mucous coat, followed by a light sero-

muscular stitch in the transverse direction. He considers this to be the operation of choice in cases of congenital pyloric stenosis, owing to the ease and rapidity with which it can be carried out, but at the same time acknowledges that in extreme cases of that condition, where there is great muscular hypertrophy, it may be inadequate, and he records such a case in which, after the pyloroplasty, the pyloric orifice was still so narrow that a gastro-enterostomy was also necessary.

D. P. D. WILKIE.

DISEASES OF CHILDREN.

By A. DINGWALL FORDYCE, M.D., F.R.C.P.,
Extra Physician, Royal Hospital for Sick Children.

ACCORDING to Professor Edsall, President of the American Pediatric Society (*Archives of Pediatrics*, May 1910), "the dignity of any of the intellectual pursuits and the standing which it has in comparison with other things related to it are determined chiefly by two things—first of all, by the opportunities offered those who teach the subject, and by the manner in which these opportunities are made use of; and, second, by the extent to which those who follow that pursuit engage in matters that favourably affect the welfare not only of those individuals with whom they come in immediate contact, but rather of the public at large."

In both directions pediatrics discloses a want, although a knowledge of pediatrics is extremely important practically to the student.

As a result of the existing academic state of pediatrics the individual student receives very inadequate training in the subject, and "even more significant than this is the fact that fewer able young men than might properly be expected to do so go into pediatrics as contrasted with the number of such men that go into general medicine, and the number is less even than of those who go into neurology."

He considers that "the chief essentials for making well-trained men and for attracting first-class men into a subject as their own work are that the men shall do most of the work themselves and not merely be told about it; that they shall be made precise and critical in their methods, and that the craving for a sound understanding of the reasons for things be satisfied by having them clearly comprehend the relation between the fundamentals and the practical things."

Along such lines general medicine and surgery have recently been largely transformed, and this "is, to a large extent, true also of neurology, and to some extent of certain of the other specialities. . . . When we consider what has occurred in pediatrics, I think we must admit that the changes have been much slighter and less distinctive."

"Again, as I said, I believe the serious-minded student takes a deep interest in any subject only when he has clear conceptions of its relations to those things on which it is based. This is to my mind the most important side of the matter that I am discussing, though not usually dwelt upon. It is, it seems to me, the crux of the whole situation in so far as the character and number of the men going into pediatrics is concerned. So far as I can see, the propriety of studying pediatrics as a special subject rather than as a mere part of general medicine is based essentially upon the fact that the infant and young child differ from adults enormously in degree, and almost equally in kind, in susceptibility to infections, and especially in liability to derangements of nutrition. This constitutes a really profound difference, it appears to me, and gives much greater justification for specialisation than any that is based upon the different organs of the body, for it demands of those who would enter into pediatrics in a broad spirit very wide and subtle knowledge of the two types of work that are now, and probably will be for years to come, the most progressive and most productive lines of work in all medicine, but that are at the same time the most complex and difficult. I mean, on the one hand, infection, immunity, and hygiene; on the other, the physiology and pathology of nutrition. In spite of the fact that these subjects are simply teeming with points that are of the most intense interest in acquiring sound and broad methods of practice, there are certainly scarcely any places where an attempt is made to bring out systematically and thoroughly their relation to clinical pediatrics. So far as these subjects are at all broadly dwelt upon by clinical teachers, it is almost entirely in courses on general medicine, not in pediatrics, though they are of even more intense interest practically in the latter. It is no wonder that in the eyes of many of the best students pediatrics becomes the tail to the general medical kite, when the things most intimately related to it are largely neglected in direct relation to it, but are taught in practical relation to other clinical subjects. As I have intimated, however, I think that we may more justly compare the conditions surrounding pediatrics to those in neurology rather than to those in general medicine, and, as I have said, to the disadvantage of pediatrics. But the same explanation of the different status of the two may be used here: In every place where neurology occupies a conspicuous position in the curriculum and is highly regarded by students it will be found that the fundamentals are most intimately related to the clinical teaching, and there are special courses, usually directly associated with the clinical teaching, for broadening the student in his knowledge of the anatomy, physiology, and pathology of the nervous system.

"The manner in which this disadvantageous state of things can be overcome is, I think, indicated by what I have just said. Students

should be taught in the pediatric department, or by the pediatric department in association with other departments—and not simply in some department entirely separate from pediatrics—the important direct practical bearings of the study of the physiology and pathology of nutrition, of infection and immunity, and of all the fascinating things that fall under the name hygiene.”

A STUDY OF 550 CASES OF TYPHOID FEVER IN CHILDREN.

Professor Adams, of Washington, gives (*Amer. Journ. Med. Sci.*, May 1910) the results of his study of 550 cases seen during the years 1872 to 1908 inclusive at the Children's Hospital.

Throughout this period there was an annual increase in the number of cases treated in the hospital relative to the whole number of patients admitted, this increase being uniform, except in two instances, when it was much greater owing to the prevalence of enteric fever, in epidemic form, in the city.

Four hundred and twenty, or 76.54 per cent., of the cases were admitted during July, August, September, and October.

The course of the fever in children is usually of the remittent type, ranging from 103° F. to 105° F., and terminates by lysis.

Rose-spots are not as frequent in children as in adults, while hæmorrhage occurred in fifty-four cases (9.8 per cent.), twenty-seven (50 per cent.) of which died.

In one case there were three profuse hæmorrhages, and the child recovered, while in the twenty-seven fatal cases, but one hæmorrhage was recorded.

“Abdominal tenderness and gurgling were as frequently observed as in the ordinary diarrhoea of children. Indeed I regard the gurgling and tenderness in the right iliac fossa as of little practical clinical value. Of the 550 cases there were seventeen (3 per cent.) with perforation, all of which were fatal. The diagnosis of perforation was made in every case within a few hours after its occurrence. In several cases an operation was proposed, but the parents would not permit it. In other cases peritonitis developed so rapidly that an operation was not deemed advisable. Three children were operated on when *in extremis*, and died a few hours thereafter.”

There were sixty-five deaths, a mortality rate of 11.8 per cent.

“Taking the periods separately, we see the greatest reduction in the last decade and a half, which is unquestionably due to the methods of treatment employed.”

	Cases.	Deaths.	Mortality Per Cent.
1872-1882	26	8	30.76
1882-1891	59	12	20.33
1892-1903	252	28	11.1
1903-1908	273	17	7.9

Treatment.—"The general management of the cases was of the same character throughout, but the systematic methods of the trained nurse, which superseded the crude ones of the unskilled in the first decade, contributed much to the better results obtained in the second and third periods.

"The *diet*, which was uniformly liquid during the first three decades, consisted of milk and animal broths, except in two cases in which 'pudding diet' was noted. I am not familiar with this last-named food for enteric cases, nor was I able to ascertain its full meaning, but I suspect that the patients for whom the pudding was ordered were in the convalescent stage.

"In the first decade there were twenty-six patients who were treated as follows:—

	Cases.
Cold sponging	5
Antiseptic treatment	1
Antiperiodic treatment	20

"It will be seen that twenty received quinine. During this period Liebermeister's treatment was in vogue, and I can recall the large doses of quinine given, which had little effect upon the fever, but often irritated the stomach and increased the nervous symptoms.

"In the second decade fifty-nine patients received the following treatment:—

	Cases.
Cold sponging	23
Cold pack	1
Antiseptic treatment	5
Eliminative and antiseptic treatment	4
Nervous symptoms treated	32
Antiperiodic treatment	30
Antipyretic treatment	16

"Daylight was beginning to dawn on the treatment, and the beneficial effects of reducing high temperature by external applications of cold were realised. This change of treatment was not well established when that pernicious class of drugs, the so-called antipyretics, was introduced. Antipyrin was administered in sixteen cases, four of which died. I remember with what pride we gave the synthetical preparations to demonstrate their power of quickly reducing high temperatures. It was quite two years before we realised that, while the temperature was being so beautifully lowered, the necessity for stimulation increased.

"Quinine was now given to 50·8 per cent. of the cases, and undoubtedly played its part in augmenting the number requiring stimulation.

"In the third decade the 252 cases were treated as follows:—

	Cases.
Hydrotherapy	213
Antiseptic treatment	33
Diarrhoea	4
Hæmorrhage	1
Heart stimulants	31
Nervous symptoms	1
Antiperiodic treatment	27
Antipyretics	1

"In this decade the treatment by the various *intestinal antiseptics* was introduced, but, after a fair trial, they were discontinued in my service, because I was not convinced that any benefit resulted from their administration.

"Twenty-seven received quinine, because of mixed infection, but only four were given antipyretics; phenacetin was given to them to allay nervous manifestations and not to reduce temperature. Of 252 cases 213 were treated by hydrotherapy. Under this head are included cold sponging, the cold pack, and tubbing after the method of Brand. The *regular* treatment recorded in the tables means one or all of the three methods, according to the indications in each case. About the same number as in the previous decade received stimulants, but for a different purpose. While in the second decade such drugs were necessitated by the cardiac depression from the coal-tar derivatives, now they were given as routine treatment in carrying out the Brand method.

"In considering the results obtained in this one hospital during the last decade, it may not be wise to lay too much stress upon figures. The reduction in death-rate may not be due to the treatment, but by comparison with the mortality in preceding periods under different methods it emphasises the following facts:—

"From 1892, the beginning of the third decade, to 1898 inclusive, the treatment followed was hydrotherapy, antiseptic, and antiperiodic. During this time eighty-eight cases were treated, ten of which died, giving a mortality of 11·36 per cent. At the beginning of 1899 the purely hydrotherapeutic treatment was begun, and has been strictly followed throughout the remainder of the decade, with the result that of the 164 cases then treated eighteen died, giving a death-rate of 10·97 per cent. Four cases of the last series died of pulmonary tuberculosis either during or directly following a typical course of enteric fever. We may rightly exclude them from our mortality list, when the death-rate will be 8·54 per cent.

"Some slight changes in treatment have been instituted during the last half decade. The diet was augmented in nutritive value by the addition of cereals, eggs, and bread to the prescribed routine of milk

and broths. The patient's ability to digest such 'soft food' was carefully watched, and only two or three instances were recorded in which the semi-solid food had to be discontinued. I was rather sceptical at first as to the good results from giving semi-solid food to typhoid fever patients, but I must confess to a conversion to the method so well portrayed by Shattuck. Realising that diarrhea is the exception in the child with typhoid fever, one can safely venture the use of liberal feeding. While an occasional case may not tolerate anything but liquid food, the majority will not only relish, but will digest and assimilate soft toast, cereals, and soft-boiled eggs. By adopting this method, most of the heartrending scenes of the sick-room will be avoided. The otherwise patient child no longer begs and cries for 'something to eat;' there is no longer progressive emaciation until the little skeleton is covered by loose skin hanging in folds; relapses become less frequent; convalescence is shortened; and complete recovery replaces prolonged invalidism.

"Our ideas on the Brand method have changed materially in that it was only used in three cases during this last period. Its beneficial effects have been demonstrated, but children do not require such heroic treatment; the sponge bath is quite as effective in reducing temperature, in allaying nervous perturbations, and in stimulating the activity of the emunctories. Intestinal irrigation was recently tried in a few cases, but its beneficial effect is not yet evident.

"The table shows the methods of treatment:—

	Cases.
Regular	165
Brand	3
Quinine	22
Irrigation	24
Antiseptic	15
Eliminative	3"

MENTAL DISEASES.

By J. MIDDLEMASS, M.D., F.R.C.P.,

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STATISTICAL STUDIES IN HEREDITY.

It cannot but be admitted that, until recently, the study of the problems of heredity from the mathematical standpoint has been seriously defective. Thanks to the labours of Galton, Pearson, and others, this reproach is apparently about to be removed. The problems to be solved are capable of attack by mathematics, and it is only because the necessary statistics have not been available that work on this line was not attempted. Two memoirs have recently appeared

from the Eugenics Laboratory of London University dealing with the inheritance of phthisis and of insanity, one by Heron, the other by Goring. The former is entitled "A First Study of the Statistics of Insanity and the Inheritance of the Insane Diathesis." To obtain material for this inquiry, attention was first turned to the Asylum Annual Reports, which are published by every county and borough asylum. But it was soon seen that these are of practically no use for a statistical inquiry. Their main defect lies in their containing no record of the total number of relatives of the patients and their mental history. In addition to this there is required accurate information regarding the mental statistics of a large random sample of the population. Up to the present this random sample has been only partially available. It cannot of course be found in asylum reports. To be really useful from the statistical point of view these reports must be much fuller than they are at present. This is now being recognised, and efforts are being made to supply the defect. It is suggested that much might be done by having a general register of the insane giving as full details as possible about each person registered.

In Mr. Heron's paper the material for investigation was supplied by Dr. A. R. Urquhart, Superintendent of Murray's Asylum, Perth, who has long been known as a careful collector of statistics. The class of patients he receives lends itself readily to such a useful purpose. The method employed in the inquiry is that of the fourfold table made familiar by Professor Pearson. The nature of this table is fully explained in the paper. Owing to the incompleteness of the record, from unavoidable causes, and to various other factors, certain suppositions have to be made in order to allow of any mathematical treatment of the figures at all, but the assumptions are made on seemingly good grounds, and the resulting conclusions are shown under the various assumptions made.

The results arrived at by Heron as to the intensity of parental inheritance of insanity are, as a minimum, 0.52, as a maximum, 0.62, mean, 0.57. These figures are strikingly like those obtained for a variety of other inherited characters. This close agreement is really the cause of some scepticism as to the value of statistical methods when applied to the problems of inheritance. But after all it need not be so. If there are any laws of inheritance at all, they ought to lead to very similar results when they are applied to inherited characters.

The same data have been used to calculate the value of fraternal resemblance. In this calculation allowance has to be made for the incompleteness of the record. This was put at one-fourth or one-third of that stated, and the final value of this relation was found to be from 0.45 to 0.55. This fits in well with other data relating to fraternal resemblance.

Other questions are also investigated, so far as the statistics permit.

The comparative fertility of insane and normal stocks is one of these. It is found to be in keeping with Pearson's conclusion in the case of other abnormal stocks, which is that the former are more fertile. As to the distribution of insanity within the sibship, the results here are in accordance with those ascertained for other inherited defects. There is increased liability in the earlier born members of a family.

The author's conclusions obviously have an important bearing on national eugenics.

The second paper, by Goring, is entitled "On the Inheritance of the Diathesis of Phthisis and Insanity." The statistics on which it is based are derived from an investigation of the family histories of 723 convicts in respect to tuberculosis, and of 1433 histories relating to insanity. "In every history was recorded the total number of members in the family, the age of one member, with his position in the family, and the number of the members who had survived to the ages of 14 and 23 respectively." The data were tabulated by means of the usual fourfold table. From these are deduced the co-efficients for the correlation in parental inheritance of pulmonary phthisis. These co-efficients vary according as certain factors—such as the age of the offspring when the history was given—are neglected or taken into account. The maximum value for the co-efficient is 0.62, the minimum 0.43, and the probable actual mean 0.50. The last is the same as that arrived at by Pearson, with different data.

The statistics used by Goring for ascertaining the intensity of the insane heredity are the same as for the previous investigation; 159 convicts were insane, while 1274 were not insane. The latter were taken as a basis for a representative sample of the general population. On this basis the intensity of inheritance was found to be 0.47, a figure only slightly lower than that obtained by Heron, and very similar to those for other hereditary characters.

The same figures were used to ascertain the influence of environment on the incidence of phthisis. The result was to show that at least there is no greater correlation between parents and offspring in the poorer classes than in the well-to-do. If anything, the figures rather favour the former. This result is not quite what one would expect, but it is admitted that the data are scanty, and the probable error therefore considerable.

GENERAL PARALYSIS (IN THE YOUNG).

A case of the juvenile form of this disease is recorded by Professor E. Régis (*L'Encéphale*, February 1909). This is a detailed account of the seventh case observed by the author. The patient was a male, in whom the symptoms of general paralysis began to manifest themselves when he was about 15 years of age. The chief interest of the case

lies in the fact that there was a definite syphilitic taint, and specially in the positive result to the test for the Wassermann reaction. This appears to be the first juvenile case in which this reaction has been demonstrated.

Two other cases of the same form of disease are reported by Dr. Mondor in the same journal (p. 181). They were both males, aged 15 and 16 respectively. Syphilis was suspected to be present, but was not definitely proved. No test for the Wassermann reaction was made.

Drs. Brissaud and Gy put on record (p. 172) the occurrence of general paralysis in a father and daughter. In the former, syphilis was ascertained to have been acquired; in the latter it was congenital. The father's age was 44 and the daughter's 19 on their admission to the asylum.

At a meeting of the Société de Psychiatrie in Paris Drs. Dupouy and Leri reported a case of juvenile general paralysis, with an account of the autopsy (*L'Encéphale*, December 1909, p. 562). The patient was a female, who first showed signs of the disease when about 21, and died two years later. There were strong evidences of the existence of hereditary syphilis. This was supplemented by the facts that her mother died of locomotor ataxia, and her brother from general paralysis also. There were other interesting facts in the case. The leucocytosis in the pia and round the vessels was not due to lymphocytes, but to polymorphs. This was exactly the reverse of the type of cell present in the cerebro-spinal fluid obtained sixteen months before death by lumbar puncture. The explanation of this is suggested to lie in a genital infection.

Marchand and Petit report a case of general paralysis manifesting itself two years after syphilitic infection (*L'Encéphale*, January 1910, p. 88). The latter occurred at the age of 19, and the patient died less than a year after the appearance of paralytic symptoms. The interest in this case lies in the remarkably short interval between infection and the manifestation of cerebral affection and the early age at death. The one is, of course, dependent on the other, but both are unique.

SYPHILIS AND INSANITY.

This paper, by Rosanoff and Wiseman, gives the results of an investigation of the blood and cerebro-spinal fluid by the Wassermann and Noguchi reactions, as well as the cytology of the latter fluid in various forms of insanity (*Amer. Journ. of Insanity*, January 1910, p. 419). The methods of examination are described, and the results are set out clearly in three instructive tables. The conclusions they arrive at are:—

1. The regular absence of lymphocytosis, of the Wassermann and butyric acid reactions in psychoses with arterio-sclerotic disease due

to old syphilitic infection indicates that these conditions are to be regarded as sequelæ of syphilis, the syphilitic process itself being already extinct.

2. In general paralysis either the Wassermann or the butyric acid reaction is invariably found, and most frequently together. No doubt can any longer be entertained of the essential dependence of general paralysis upon syphilitic infection.

3. As the above reactions seem to indicate syphilis only when it is in an active form, their regular occurrence in general paralysis would tend to prove that that disease is a manifestation of active syphilis, of activity of the *spirochaeta pallida*. Further evidence on this point is, however, desirable.

4. In no other common psychosis do either of these two reactions occur with any regularity, or even with special frequency.

5. From the standpoint of diagnosis, cytological examination of the cerebro-spinal fluid is an indispensable aid in the practice of psychiatry. With the further aid of the Wassermann and Noguchi reactions the diagnosis of general paralysis can be either established or excluded with practical certainty.

THE CEREBRAL CIRCULATION.

Duret, the author of the classical work on this subject published in 1874, again returns to it (*L'Encéphale*, January 1910, p. 7). He discusses three points. (1) The distribution and delimitation of the arterial territories in the cerebral hemispheres. As to this he maintains the position he took up in his original work. (2) The existence and site of anastomotic relations of these different territories, and the question of the arterial mesh of the pia mater. As to the first of these he states that there are a number of variations, and gives percentages of their occurrence in the forty-five brains examined. These do not differ materially from his earlier work, which established the fact that in certain positions, as a rule, anastomoses occur between the arterioles of all the three main cerebral arteries. As to capillary anastomoses he still adheres to his original view that there are none, and that the cortical arterioles are terminal. (3) New researches on the vascularisation of the basal ganglia. These show a greater variation than was before recognised, and several departures from the normal are carefully described and figured. While noticing other recent work, it is to be regretted that he omits all mention of that of Beevor, though he refers to that of some American anatomists.

PATHOLOGY OF DEMENTIA PRÆCOX.

Drs. Klippel and L'Hermitte report a case of this disease of the catatonic type, with particulars of the autopsy (*L'Encéphale*, February 1910, p. 151). The chief interest lies in the latter. They found atrophy of a large number of the pyramidal and polymorph

cortical cells, a marked proliferation of the neuroglia cells in certain regions, and an absence of vascular lesions.

The same authors also (p. 158) give a short account of their examination of other cases of dementia præcox in which the cerebellum specially showed signs of disease. In one case there was atrophy of a lobe. This affected all its constituent parts, and the cells were correspondingly diminished in number. In a second case the atrophy of a lobe was less marked. They also recognise a second type in which both hemispheres are atrophied. In this there was likewise a diminution in the number and size of the Purkinje and granule cells. These changes are not typical of dementia præcox, as they have been found in 5 out of 17 cases only. In some they are probably secondary to disease of the cerebral hemispheres; in others they may be regarded as coming within the list of stigmata of degeneration.

In the same journal (p. 155) M. Dufour gives particulars of a case of dementia præcox with decided cerebellar symptoms. The mental symptoms were those of enfeeblement of memory, apathy, and an absence of delusions. The muscular symptoms were unusual. These took the form of a slight degree of catalepsy, absence of stereotypism and echokinesis, increased suggestibility in performing movements and assuming attitudes, difficulty in speech, titubation of gait, rapid pronation and supination of the hands, trembling attacks, and increased knee-reflexes. All these symptoms, in the author's opinion, point to cerebellar disturbance.

Claude (p. 161) also reports a case of dementia præcox in which there was atrophy of the cerebellum with a lesion of Purkinje's cells.

Drs. Klippel and L'Hermitte report (*L'Encéphale*, May 1909, p. 504) yet another case of dementia præcox with autopsy. In cases of this kind they point out that it is necessary to distinguish the various morbid changes that may be found. Of these they recognise four—antecedent, immediate, consecutive, and terminal. In the case reported, as in others recorded by them, the lesions were confined to the nerve-cells and neuroglia, and did not at all affect the vessels or meninges. If any changes of the latter tissues are present, they are probably terminal lesions. The changes found were atrophy and disappearance of a large number of pyramidal cells, and marked regressive lesions of the fusiform and polymorph cells. The affection of the neuroglia was most evident in the superficial and deepest layers of the cortex. The cellular lesions were most marked in the frontal and occipital lobes. The motor regions were nearly quite healthy.

BLOOD COUNTS IN DEMENTIA PRÆCOX.

Dr. F. M. Barnes, Jun., gives the results of a very careful examination of two cases of mental disease which he regards as atypical forms of dementia præcox (*Amer. Journ. of Insanity*, April 1909, p. 559).

After a description of the history and symptoms of the two cases he gives particulars of the examination of the blood, the blood-pressure, and the temperature. These are summarised by several very interesting charts. His conclusions are cautious in view of the limited number of cases investigated. He, however, feels justified in stating that these prove that there was a hyperleucocytosis coincident with the onset of the abnormal phases. No fully satisfactory explanation of this variation has presented itself. Though the conclusions are meagre, the facts set forth in the charts are evidence of assiduous and careful observation, and should prove of great service to others engaged in similar work.

METABOLISM IN DEMENTIA PRECOX.

Dr. F. M. Barnes, Jun., carried out on the same two cases referred to in the previous paper a very careful investigation of the urine. His object was to determine, if possible, whether any metabolic or toxic process was responsible for the mental attacks. Evidence of these processes was sought by chemical estimation of the various urinary constituents. During the investigation the diet was specially prepared and given in weighed quantities. The total quantity, specific gravity, the nitrogenous constituents, sulphates, phosphates, chlorides, acidity, and indican content were all carefully estimated, and the results are set out in two tables. Investigation of these tables has not led the author to the conclusion he hoped for, as no evidence could be deduced from them that any metabolic disorder existed. As he states, however, this does not of necessity mean that no such disorder was present, but only that the means employed did not show any. Even negative investigations may have very great value, and Dr. Barnes is to be commended for his very careful work.

AUTO-INTOXICATION IN ACUTE MELANCHOLIA.

This investigation was carried out by Drs. Myers, Fisher and Diefendorf in the laboratory of the Connecticut Hospital for the Insane (*Amer. Journ. of Insanity*, April 1910, p. 607). As in the work of Dr. Barnes, the results were mostly negative. Neither in the urine nor the feces was there any evidence afforded by the methods of investigation of any auto-intoxication due to intestinal putrefaction. The work must, however, not on that account be considered valueless.

TREATMENT OF MENTAL DISEASES.

Drs. Damaye and Muzie put on record (*L'Encéphale*, April 1909, p. 343) the results of their treatment of a number of mental cases by collargol. About 2 grains a day (12 centigrammes) were given for several weeks, and, of eight cases reported on, four were much

improved and four were cured. They were all females, varying in age from 27 to 46, suffering mostly from melancholia, but also from confusion and stupor, of duration from a few days to eleven years. It was observed that the physical condition improved immediately treatment was begun, and the weight steadily increased. Blood examinations showed an initial rise in the number of leucocytes, especially the polynuclear form. This was in accordance with the views on which the treatment was based, that of combating the toxins to which the mental disease was considered to be due. The results recorded appear to call for a more extensive application of this agent.

DISEASES OF THE EAR.

By J. S. FRASER, M.B., F.R.C.S.,

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OTITIC CEREBELLAR ABSCESS.

Etiological Factors.—*Age.*—Nearly 70 per cent. of otitic cerebellar abscesses occur between the ages of 11 and 30 years. *Sex.*—The average percentage of cases taken from the statistics of Koch, Körner, Okada, Heimann and Neumann show that 71 per cent. of cases occurred in males, and 29 per cent. in females. *Side.*—Again, taking the collected statistics of the above-mentioned authors, it is found that 51·7 per cent. of the cases were right-sided and 48·3 per cent. left-sided. *Causation.*—From collected statistics, 17 per cent. of otitic cerebellar abscesses follow acute, and 83 per cent. follow chronic suppurative otitis media. In the majority of cases cholesteatoma is present.

Pathology.—The suppurative process in the middle ear may reach the intra-cranial contents—(1) Directly by erosion of the intervening bone. (2) By vascular channels, (*a*) by extension of septic thrombosis from the veins of the mucous membrane of the middle ear to the lateral sinus. Further extension takes place either directly through the walls of the sinus or along tributary veins. (*b*) In other cases by embolism, the brain abscess being accompanied by formation of abscesses in other organs, the condition being part of a general pyæmia. (3) By extension along the perivascular lymph sheaths. (4) The septic process may invade the inner ear through the oval or round windows, by erosion of the promontory or of the external semi-circular canal, and, once the inner ear is infected, the process may extend either along the lymphatic vessels of the inner ear, especially the ductus endolymphaticus, or along the eighth nerve, though in this case the more usual result is a leptomeningitis.

According to Neumann's investigation of nineteen cases of cerebellar abscesses following on *acute* suppurative otitis media, there was only one case which showed labyrinthine suppuration; in the other cases the abscess followed a sinus thrombosis or an extra-dural abscess in the posterior fossa. In cases in which the abscess is secondary to a *chronic* suppurative otitis media, the pathological process is totally different. Of the collected cases which have been thoroughly investigated, nearly 44 per cent. showed suppurative labyrinthitis, and in 30 per cent. of these there was cholesteatoma in the middle ear. The spread of infection by way of the aqueduct of the vestibule—a frequent path of infection according to Boesch and Wagner—has, in Neumann's opinion, been proved definitely in only one case.

That cerebellar abscess is more common in chronic than in acute middle ear suppuration is due to the fact that in the latter condition the mucous membrane and bony wall of the middle ear spaces are usually intact, while in chronic middle ear suppuration the mucous membrane is desquamated and the bony wall is often carious.

In many chronic cases fibrous adhesions form between the dura, the pia-arachnoid, and the brain surface before actual extension of the pus to the interior of the skull takes place. In such cases, when the pus actually perforates the bony wall, these adhesions prevent its spread into the subarachnoid space, and a localised abscess of the brain develops as opposed to a general leptomeningitis. In contrast to tempero-sphenoidal abscesses, second and even third abscesses may be found in the cerebellum. The relation of the abscess to the dura, as indicated by local formation of adhesions, varies according to the path of infection; thus adhesions form over the sinus groove, over the sacculus endolymphaticus, or over the internal auditory meatus (Ballance).

Whether the abscess is acute or chronic depends upon the virulence of the infection rather than upon the anatomical situation of the pathological process. According to Hezler, in 38·5 per cent. of cases of cerebellar abscess arising from acute, and in 65 per cent. of those arising from chronic suppurative otitis media, the abscess is encapsulated by a membrane, varying in structure from a loose fibrinous reticulum to a firm wall composed of well-formed fibrous tissue. Outside of this is a zone of oedematous brain substance. The contents vary in appearance: they may be thin in consistence with a greyish colour, the cellular elements forming a layer on the walls of the cavity. Occasionally the pus may be absorbed, leaving a cyst with clear watery contents, or, in very rare cases, absorption is complete—a scar only being left to indicate the site of the abscess. A few cases have been recorded in which the abscess has emptied itself by bursting externally.

Symptomatology.—About 10 per cent. of cases are latent, giving rise to no symptoms. In the so-called uncomplicated cases of cerebellar abscesses the temperature is normal or subnormal and the pulse-rate

is slow. *Focal Symptoms*.—These are due to (1) a lesion of Deiter's nucleus (vestibular nystagmus, vertigo, vestibular ataxia); (2) affection of the sensory tract (hemiparesis and hemiataxia of the upper limbs on the same side). *Nystagmus*.—Much of our present knowledge of this important sign is due to the recent work of Bárány. (1) Spontaneous nystagmus directed towards the affected side may be due to circumscribed disease of the labyrinth. In this case the irritability of the labyrinth is usually normal, *e.g.* syringing the affected ear with cold sterile lotion induces nystagmus to the opposite side. Nystagmus towards the affected side, however, is usually due to cerebellar abscess, and this diagnosis is made certain if the excitability of the labyrinth is found to be lost. (2) Spontaneous nystagmus towards the sound side may be due to the circumscribed labyrinthitis having become generalised, or to cerebellar abscess. If the irritability of the labyrinth is lost, the differential diagnosis is impossible until the operation of extirpation of the labyrinth has been performed. If the nystagmus was of labyrinthine origin, it disappears in two or three days after the labyrinthine operation. If, however, it was due to cerebellar abscess, it not only persists after extirpation of the labyrinth, but may increase in intensity or change its direction.

Ataxia.—If the ataxia is vestibular in origin, the patient, on standing, leans to the opposite side to that towards which the spontaneous nystagmus is directed. Rotating the head to the side towards which the spontaneous nystagmus is directed causes him to bend backward. In bed the patient lies on the affected side, as in this position he naturally looks away from the affected side—a position of the eyes which does not cause increase in the vertigo. In cerebellar ataxia the head is held stiff and inclined towards the affected side; frequently the occiput is supported by the hands. If the extremities on the same side as the diseased ear show motor ataxia, and if there is hemiparesis on this side, while sensibility is normal, a focal cerebellar lesion is indicated (Monakow). *Trophic Disturbances*.—Rapid and extreme emaciation may be observed.

Remote Effects.—These are due to increase of intra-cranial pressure and to inflammatory oedema. Sensory disturbances are manifested by somnolence and its attendant phenomena; in some cases, however, there is delirium. A slow pulse, down to 30 per min., is a marked feature in most cases, and arrhythmia of the pulse is frequently present. Cheyne-Stokes respiration is rare, but sudden death, due to stoppage of respiration, is a common termination of unoperated cases. Persistent headache is present in nearly all cases, and in 33 per cent. it is characterised by being localised to the occipital region (Okada). Not infrequently the headache is limited exclusively to the forehead. Tenderness on percussion over the occipital region was present in only one-third of Neumann's cases. Pain and stiffness of the muscles at the

back of the neck is not uncommon. Vomiting, of the cerebral type, is rarely absent. Papillitis or optic neuritis is more frequently present than in cases of abscess of the temporal lobe; when present, the changes may be more marked on the side of the lesion. Ocular paralysis, pupil changes, and ptosis are rare: conjugate deviation, usually away from the affected side, has been observed in a few cases. In the great majority of cases the abscess is due to suppurative labyrinthitis, and in all these the hearing power is markedly affected. Facial paralysis with involvement of the palate is strongly in favour of cerebellar abscess. Bruns and others maintain that in cases of cerebellar abscess the knee-jerk is lost, but according to Oppenheim it is usually retained. Neumann states that the presence or absence of the knee-jerk is of no aid to diagnosis. Disturbances in articulation and dysphagia may be present. Incontinence of urine, changing in the later stages to retention, is not uncommon; in a few cases albumen and sugar have been found in the urine (Oppenheim, Macewen).

Stages.—The stages of a cerebellar abscess may be divided into (1) initial; (2) manifest; (3) terminal.

1. In the initial stage the signs and symptoms might all be accounted for entirely by the disease in the temporal bone. This stage may be ushered in by a rigor, followed by a normal or subnormal temperature. Pain is localised to the ear or to the occiput. Stiffness of the neck, attacks of vertigo, slight nystagmus, and very slight hemi-ataxia are characteristic features. The patient is drowsy, and on this account appears more severely ill than in disease limited to the temporal bone.

2. In the manifest stage the headache is more severe and there is distinct tenderness over the occipital region. Marked rigidity of the muscles of the back of the neck causes head retraction. Vomiting is frequent, but disappears if the patient develops marked nystagmus. Attacks of vertigo occur frequently. The temperature is normal or sub-normal, the pulse-rate is slow, and the respiration is hurried or Cheyne-Stokes in type. Later the ocular centres are involved, bulbar speech and dysphagia become marked, and the patient passes into a state of complete somnolence with incontinence of urine and fæces.

3. In the terminal stage of untreated cases death occurs most frequently by sudden cessation of respiration, the heart continuing to beat for some time. Less often death is brought about by the abscess bursting into a ventricle or by the formation of a rapidly spreading leptomeningitis set up by direct spread from the abscess.

The signs of rupture into a ventricle come on with marked rapidity: the face becomes livid; the respirations are greatly hurried, shallow or stertorous; the temperature rises; the pulse-rate is quick; and generalised muscular twitchings with perhaps convulsions and tetanic seizures occur. These are followed by coma, and death occurs in six to twelve hours after the first indication of the rupture (Macewen).

Diagnosis.—This is usually extremely hard, owing to most of the signs and symptoms being present in other intra-cranial complications of suppurative otitis media. Often the conditions found during the course of the operation are helpful. If time allows, the examination of the cerebro-spinal fluid may afford useful information. Briefly, the presence of polymorphs, bacteria, and increase of albumen indicate the presence of a purulent meningitis, with or without brain abscess formation. It must be insisted upon, however, that a negative finding is of no value as a therapeutic guide.

Differential Diagnosis.—(1) *From abscess of the temporal lobe.* This latter condition is pointed to by the presence of sensory or motor aphasia, hemianæsthesia and hemiparesis of the opposite side of the body, paralysis of the oculo-motor muscles (as opposed to paralysis of individual muscles of the eyeball), and headache over the parietal region. Spontaneous nystagmus is rarely present. (2) *From labyrinthine suppuration (vide supra).* (3) *From purulent meningitis.* High temperature, small quick pulse, Cheyne-Stokes respiration, scaphoid abdomen, cutaneous hyperæsthesia, sudden diminution in hearing power, general convulsions and coma indicate meningitis. (4) *From meningitis serosa and tuberculous meningitis.* Here the symptoms are those of diffuse meningitis, in which cerebral pressure symptoms predominate. (5) *From hysteria.* (6) *From melancholia*—when the abscess is in the latent stage. (7) *From uræmia.* (8) *From cerebellar tumour.* The presence or the history of suppurative otitis media favours abscess.

Prognosis.—Recovery has occurred in about 56 per cent. of those cases in which the abscess has been evacuated. It must be remembered that in a large number of cases the abscess is complicated by meningitis or by the presence of a second abscess.

Treatment.—As a preliminary, the radical mastoid operation must be performed in all cases. The question of the labyrinthine operation depends upon the presence or the absence of labyrinthitis, and cannot be discussed here. There are two routes by which the cerebellar abscess may be reached—(1) Behind or external to the sigmoid sinus; it should be noted that when this route is followed, the abscess is frequently missed. (2) In front of or internal to the sigmoid sinus; in this way the cerebellum is reached by the same route as that followed by the infection.

After the performance of the radical mastoid operation, the usual method of procedure is to expose the sigmoid sinus below the knee, and then to remove the bone internal to the sinus almost up to the internal auditory meatus, thus opening up the external and posterior semi-circular canals and the endolymphatic sac, and exposing an area of dura about the size of a florin. Neumann states that the presence or absence of pulsation affords no information as to the existence or not of an abscess. After crucial incision of the dura the cerebellum is explored with sinus forceps: when the abscess has been found, the pus is evacu-

ated and a drain inserted. It is important not to remove the drain too soon.

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NEW BOOKS AND NEW EDITIONS.

A Practical Treatise on Ophthalmology. By L. WEBSTER FOX, M.D., LL.D.
Pp. 763. New York and London: Appleton & Co. 1910.
Price 25s.

WHEN a book has to be reviewed which deals with a subject upon which there is already a mass of literature, the thought comes into one's mind—Wherein does this book excel others? or What has its author to say which apparently in his judgment has not been sufficiently well brought out by other writers? In the case of Dr. Fox's treatise there can be no doubt on this point, for his book describes in fuller detail, and with greater precision, the operative procedures in connection with the eye, than do most of the text-books, and it provides a greater variety of different methods of accomplishing a certain result by operation. It is plain to the reader that Dr. Fox has much skill as an operator, and takes great pains to select the methods which, in his opinion, are best suited to the needs of the case. Not that we mean to imply that his book is weak in other directions, but that it is relatively strong in this. Most of the standard operations are well described and well figured, though some few are not. Certainly the delineation of the clinical features of disease is by no means so well done; it is apt to lack definiteness and precision here and there, a want all the more striking in contrast with the other parts. The illustrations, which are very numerous, and which include both coloured and black and white to the number of three hundred, are also, for the most part, very valuable, bringing out the chief points very clearly, but here again there are some poor ones; for example, that of staphyloma on p. 235 is not a credit to the book. As is apt to be the case with other authors also who venture to display their knowledge of the classical tongues in the nomenclature of diseases and structures, the author falls now and again into some slip which might readily have been avoided. There are numerous minor points upon which one might very fairly challenge Dr. Fox's accuracy of description and wisdom in treatment, but we shall only note one of each by way of illustration. As regards description, we consider his classification of ulcers of the cornea—a subject of the very greatest

importance—neither logical nor scientific; as regards pathology, his statement (p. 289) that a sarcoma of the choroid may attack the optic nerve and brain is not accurate; and in regard to treatment, most surgeons would highly disapprove of bandaging under an impervious and intransparent covering the unaffected eye in a case of gonorrhoeal ophthalmia. Some of the statements are a little rash, *e.g.* that retinal changes occur in all chronic anemias, that infection in ophthalmia neonatorum takes place during delivery, and that “immaturity of the cataract is always a contra-indication for extraction.” In regard to these and other points in the book, one cannot avoid the impression that Dr. Fox, though an admirable clinician and operator, is not quite so conversant as might be with the work, opinions, and practice of his colleagues in places other than Philadelphia.

A very useful chapter at the close describes laboratory and bacteriological technique, methods of mounting and preparation, the most suitable stains, &c.

We have mentioned thus certain features of the book which seem to us to detract a little from its genuine merits, but, on the whole, it is a well composed and faithful representation of modern belief and practice, well illustrated, and calculated to be a reliable guide to the student of diseases of the eye.

Atlas of External Diseases of the Eye. By Professor GREEFF, Professor of Ophthalmology in the University of Berlin. Translated by Dr. SHEDD, New York. Pp. 140. Royal 8vo. London: H. K. Lewis. 1910. Price £2, 2s. net.

THIS handsome volume, dedicated to Professor Axenfeld, is the product of years of work in conjunction with Sculptor Kolbow of Berlin. It consists of eighty-four illustrations in colour from wax models printed on fifty-four full-page plates, with explanatory text, the illustrations being taken from models in the Pathoplastic Institute in Berlin. The coloured plates, which are beautifully executed, were obtained by making, after a special method, a mask of the living subject, which was then filled with wax. From these wax models photographic reproduction in four colours was made, giving not a schematic representation, but the actual case as it appeared in the University Ophthalmic Clinic of the Berlin Charité Hospital, no retouching being allowed. By means of such models a pictorial plasticity, unattainable by the most accomplished draughtsman, is obtained. No expense has been spared by the publishers, Urban & Schwarzenberg, in producing a work which is unique in its way, and which is a real credit to the distinguished Berlin School of Ophthalmology. The translator and present publisher have each done their work well, and English-speaking practitioners are under a debt of gratitude to them both for placing this valuable work before them unimpaired.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES AND NEWS.

Florence Nightingale.

To those of us who remember with a burning sense of shame the dark winter of the Crimean War, the awful blunders of the military commanders, the fatuous imbecility of the transport, relieved by the magnificent gallantry of the young officers and the common soldier and sailor, there always remained one brighter spot, the work of Florence Nightingale and her gallant nurses. Our views were one-sided, the newspaper reporter and Longfellow's poem made us think of a being hardly earthly—giving comfort by her smile. Florence Nightingale was not an angel, but a very remarkable woman, by no means faultless—dogged, self-opinionated, and very jealous. Sidney Herbert's life showed how he was tried by her, and her relations to Miss Stanley and her nurses were very strained. Still, with it all, Florence Nightingale was the person needed for the crisis. She was a strong, capable woman, and her dogged perseverance and her almost brutal frankness were needed. On her return to England, to a life spent much in bed or on sofa, she was honoured and loved, and was for the last fifty-five years a marvellous propelling force in the direction of good nursing. Her letter to the St. Thomas's nurses was a yearly pleasure. Her eye surveyed the nursing world: she made appointments and put the right women in them. For many years she was able to see only one visitor a day, at tea-time. (The writer spent an afternoon with her, Mr. Gladstone sat with her the day before, and the Crown Princess of Prussia the day after.) Her marvellous memory helped her to ask questions about individual nurses and associations which showed that little escaped her in the nursing world. Her influence was in the right direction—a clever, great-hearted woman, leaving a splendid example.

**The Research Defence
Society.**

THE Report of the Annual Meeting of the Research Defence Society gives us an opportunity of explaining its objects, and appealing to medical readers to support it by becoming members. The Society was founded for the purpose of making generally known the facts as to experiments

on animals in this country, and the regulations under which they are conducted; the immense importance of such experiments to the welfare of mankind; and the great saving of human and animal life and health which is already due to them. At its head are men and women whose names are household words. The President is Earl Cromer, and Mr. Sydney Holland is Chairman of Committee. Among the Vice-Presidents are distinguished representatives of the Church, the Houses of Parliament, the Army, Medicine, Law, Literature, Painting, and many other branches of science and art.

The annual report states that the Society has made steady progress, and now has 3360 members and associates. It has established active branches in the principal towns of the country. During the year addresses and lantern lectures have been given in London and elsewhere. A series of popular leaflets, entitled *The Truth about Vivisection*, has been sent out to members, and a further series is in course of preparation. The Society is to make arrangements for presenting to the public the facts of the final Report of the Royal Commission on Experiments on Animals. In seconding the adoption of the report, Sir David Bruce gave striking proof of the necessity and value of animal experimentation in the investigations on sleeping sickness and other tropical diseases. Earl Cromer quoted effectively from an address by Dr. W. W. Keen, the well-known American surgeon, that to animal experiments were due the discovery of antiseptic surgery; the possibility of abdominal and brain surgery; and the reduction in the death-rate from compound fractures, ovariectomy, hydrophobia, diphtheria, cerebro-spinal meningitis, tuberculosis, and many other diseases—"a noble record!" On the other hand, the foes of experimental research had done nothing but stand in the way of progress: not a single human life had been saved by their efforts; not a single household made happy; and not a single disease had had its ravages abated or abolished. The testimony of tried men like Earl Cromer is bound to carry great weight with the people of our country. That his influence is recognised by the opponents of vivisection is evidenced by the puerile attack recently directed against his statements, but in this instance, as on previous occasions, the injustice of the attack has been exposed, and its author confounded. The recently-adopted methods of the foes of experimental research can best be met by efficient organisation of the friends of scientific progress. Deterred by previous punishment from making a frontal attack, the former have now resorted to a type of guerilla warfare, in which they attack small outposts, not daring to storm the main positions. The wonder is that, after the immeasurable benefits conferred on the lower animals as the result of experimental investigation, this "wild crusade against science" should be encouraged by the Society for the Prevention of Cruelty to Animals.

The recently-published return showing the number of experiments on living animals during 1909 illustrates how widely they enter into the life of the people. A large number were performed "either on behalf of official bodies, with a view to the preservation of public health, or directly for the diagnosis and treatment of disease." Experiments have been performed for the Home Office, the Naval Medical Service, the War Office, the Army Medical Advisory Board, the Army Veterinary Service, the Local Government Board, the Metropolitan Asylums Board, the Royal Commission on Tuberculosis, the Advisory Committee for Plague in India, the Tropical Diseases Committee of the Royal Society, and the Grouse Disease Committee. In all, more than 16,000 experiments were performed for Government departments, county councils, municipal corporations, or other public health authorities. More than half of the total number of experiments were performed by the investigators of cancer. Of the results already obtained from these, Mr. A. J. Balfour, presiding at the annual meeting of the General Committee of the Imperial Cancer Research Fund, dwelt on two which specially appealed to him. One was that the question of heredity in connection with cancer was almost negligible, an important generalisation which was rendered possible only by systematic investigations on short-lived animals. The second result was that means had been discovered to check the growth and spread of implanted cancer. No medical man can doubt that all our hopes of discovering a remedy for malignant disease are centred on the results of experimental research on animals.

"The Health of the Nations."

THE International Council of Women is a federation of National Councils or Unions of Women formed in various countries for the promotion of unity and mutual understanding between all associations of women working for the common welfare of the community. The Council was formed in 1888, and quinquennial meetings have since then been held at Chicago, London, and Berlin, and a special meeting was held at Geneva in 1908. There has just been published¹ under the above title a small book, which not only gives an account of the Council and its work, but contains also a series of reports from the affiliated National Councils of Women upon matters concerning the public health in their respective countries. The Countess of Aberdeen, who is President of the Council, set the lines upon which these reports should be drawn up, desiring special reference to (1) *Care of infants and children*; (2) *The conditions under which women carry out industrial work*; (3) *Housing of the people*; (4) *Measures in force against the disease of tuberculosis*. It seems that the roll of the International Council includes eighteen National Councils (the five Australian and Tasmanian

¹ London: Constable & Co. Price 1s. net.

Councils being counted as one), and the present volume contains reports from all of these. The scheme of drawing up the various reports upon a common plan has been adhered to, and this adds greatly to the value and interest of the series. A few of the reports would have been of greater value if the writers had quoted statistics in support of their statements, but the majority of the papers have evidently been prepared with care, and some of the writers have taken a great deal of trouble to secure the information on which their reports are based.

Particular mention may be made of the report on public health in Italy. The author, Mme. Maria Grassi Koenen, prepared, with Dr. Gugliemetti, a printed set of questions as to the care and health of children. This was published in a medical review, and, in addition, 50,000 copies were distributed among doctors and midwives. The response was disappointingly meagre. Only about 100 replies were received. In July 1906 a second series of 50,000 were distributed, and this time 500 answers were obtained. The results are summarised as follows:—

“1. First of all—and it is truly painful to make the statement—from North to South, including every part of Italy, there seems to be a horror of water.

“The child never gets a bath, except the one immediately after its birth, and even that is not given in many cases in the South. It is fortunate for Italy that it is surrounded by the sea; that, at least, is not dreaded by the people in summer. It is the custom to bathe the child now and again in wine, even among the poorer classes, who drink wine very rarely. They have no idea of cleanliness, and in the country the midwife (levatrice) is hardly ever called in—they mostly rely on the quite ignorant woman (mammone), who have little experience and any number of prejudices.

“2. Midwives are not always to be had, even if desired, and there are parishes with as many as 4000 souls where there are none.

“3. Babies are nearly everywhere wrapped up and tied, with arms down, on a cushion; this is more common in the North than the South. The wrapping is given up after the first year, but is continued during the night till its third year. The baby generally sleeps in the same bed with the parents, and if it has a cradle it is constantly swung in a most alarming manner.

“4. Mothers generally nurse their babies themselves, and very often till their third year, because they believe that they cannot become pregnant again during that time. But the worst of it is that the baby, although it does not feel the need, is made to eat as well, in order to accustom it to the food the family partakes of, and often after the second week—certainly always after the first month—it is fed with pap made of bread, garlic, and olive oil. Some tell me that these poor little creatures are often fed with soup made of vegetables,

beans, potatoes, and bread, not to forget fruit, often sour, which is supposed to harden the gums—and all this soaked in wine. Even among the very poorest classes, when the rest of the family must do without wine, babies get it, as, according to the popular idea, it is strengthening.

“Very rarely babies are brought up on other than mother’s milk: in cases of necessity, goat’s milk, not boiled, is used.

“By the end of its first year the baby gets of course the same food as the parents, and, worse still, it goes on eating from morning till night, and nearly always has a piece of bread—and that none too clean—in its little hands. It appears that gastro-enteric fever claims an exceedingly large number of victims. The ordinary children’s illnesses are aggravated by the entire absence of cleanliness and by the irrational remedies and numberless prejudices; also by the fact that doctors are hardly ever called in.”

It is satisfactory to read further on in the report that the teaching of hygiene and domestic economy is now compulsory in the Italian elementary schools. It is to be hoped that this teaching is of a practical kind. It is evident that there is plenty of scope in Italy, as indeed there is elsewhere, for the work of a Council of Women concerning itself with matters of health. For further information concerning health work in Italy and other countries, we must refer the reader to the volume of reports itself.

**The Post-Graduate
Course.**

WE believe that the entry for the Post-Graduate Courses is likely, this year, to be a large one. The maximum number of applications has already been received for the Special Course on Internal Medicine in August, and for the Special Surgical Course in September, while the limited classes in connection with the General Course, which commences on 5th September, are filling up rapidly. The demand for surgical work has been so great that it has been decided to hold additional classes on Surgical Anatomy and Surgical Pathology, which will be open to those attending the General Course on payment of a special fee.

**International Congress
of Anatomists.**

THE Second Quinquennial Congress of Anatomists was held at Brussels on 7th to 11th August, and was well attended by anatomists from this country, and from Germany, France, Italy, and America. Meetings were held in the University in the forenoon for the reading and discussion of papers, and in the afternoons demonstrations were given in the Anatomy Department. The majority of the papers were upon subjects connected with embryology and histology, both human and comparative, and comparatively few dealt with human anatomy in its more restricted sense.

Some important papers were read upon the development of blood-cells, and Professor Minot made an appeal for a more scientific terminology, based upon the morphological characters of the cells. Terms such as "normoblasts" have no definite or scientific meaning. Many of the pathological forms of cells found in man, and the embryological forms during development, are reproductions of types found constantly in vertebrates below man, and the names applied to such forms should indicate this relationship. An important step taken at the conference was the appointment of an international committee to draw up a uniform terminology for embryology, on the basis of, and similar to, the uniform anatomical nomenclature known as the B. N. A., which is now coming into extensive use, especially in America.

Among the exhibits Fetzner showed a model and sections of a very young human embryo, resembling the well-known Peter's ovum, in which both the embryo and the trophoblast had been particularly well fixed, and the histological details were very distinct. Lams (France) gave a fine demonstration of the fertilisation and the earliest segmental changes in the ovum of a rodent, and traced the effect of the tail (spiral and axial filament) of the fertilising sperm upon the ovum.

Huntingdon and M'Clure showed models and sections illustrating the development of lymph channels from early veins in the cat, and the persistence near the entrance of the renal veins into the inferior cava of lymphatic and venous communications in a South American monkey.

From this country papers were contributed by Thomson and Whitnall, of Oxford, on "The Anatomy of the Eye and Orbit": Cameron (London) on "The Development of the Anterior Commissure": and Waterston (London) on "The Form of the Stomach in Man."

Papers were also read by Berry (Melbourne) upon the "Characters of Tasmanian Crania": and by Evatt (Winnipeg) upon the "Homologies of the Vagina and Urethra in the Two Sexes": and demonstrations of specimens, &c., were given by Hill (London) of "Fertilisation and Maturation in the Ovum of *Dasymus*."

Dixon (Dublin) showed a specimen of the rare condition of the presence of three well-formed kidneys, one on the right side and two on the left.

One pleasant feature of the meeting was the friendly feeling which developed between the British and American anatomists, which, it is to be hoped, will become even stronger in the future.

AN UNUSUAL CASE OF CHRONIC INTERSTITIAL
PNEUMONIA (DIFFUSE BILATERAL PULMONARY
FIBROSIS FOLLOWING (?) INFLUENZA).¹

By ARTHUR J. HALL, M.A., M.D., F.R.C.P.,
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WE have called this provisionally a case of chronic interstitial pneumonia, in order to place it in what we believe to be its most suitable compartment, although we do not think that the name, by any means, accurately describes the condition. Its many unusual features, both clinical and histological, warrant its being recorded in detail.

The history is briefly as follows:—

The patient was a married man, aged 48 years, who had always worked as a coachman in good situations until 1908, when, owing to his employer leaving the neighbourhood, he was for some months out of a situation, and had to work as a labourer. He had always been a temperate hard-working man, was the father of a healthy family, and had never suffered from any serious illness until November 1908, when he was laid up for a few days with febrile symptoms and general malaise. His medical attendant, Mr. Lockwood, tells us that it seemed to be a typical attack of epidemic influenza with bronchial symptoms, but no pneumonia. After this he was for a long time very weak and easily tired, and from then onwards began to fail somewhat.

He was not, however, under medical supervision, and in the late spring of 1909 he was again able to take a situation as coachman. He found the work heavy owing to his being so short of breath on exertion, but kept going until June, when he was again attended by Mr. Lockwood for a similar attack to that which occurred in the previous November. This seemed also to be a typical epidemic influenza, and he was in bed three or four days. There was again no pneumonia. After this he was quite unable to do his work, for the least exertion made him quite breathless.

¹ Paper read before the Association of Physicians of Great Britain and Ireland at the Liverpool meeting, June 1910.

He was admitted to the Sheffield Royal Hospital under one of us on 5th July 1909.

Present Condition.—His appetite is good, there is no vomiting; bowels are regular; he sleeps well. There is no sweating, no pain. There is only a slight cough, with a little expectoration. His nutrition is fair. He can lie down flat without any difficulty, and whilst in bed he shows no distress.

Respiratory System.—The respirations vary from 24 up to 40 whilst in bed. Usually they are about 28. Thoracic movements are very slight, and, if anything, the right side moves a little more than the left. Measurement through the nipples, inspiration $33\frac{1}{2}$ inches, expiration 33 inches. Above the nipples the difference between the measurements is about three-quarters of an inch.

Cyrtometer tracings show an antero-posterior measurement of 19 cm., with lateral 32 cm. The right front is rather more prominent than the left, whilst the left back is rather more prominent than the right.

In front there is no impaired resonance (Fig. 1). The liver dulness reaches the fifth space in the nipple line. The cardiac impulse is in the fifth space in the nipple line, and the dulness extends up to the second left rib. Some broncho-vesicular breathing over the upper right front below the clavicle. The pulmonary second sound is markedly accentuated over the second left inter-costal space. The impulse is hardly palpable. The first sound is faint and distant. There is no murmur.

Posteriorly.—There is impaired resonance over the right base up to the angle of the scapula, with broncho-vesicular breathing. On the left side there is normal resonance to the level of the tenth dorsal spine. On each side there is marked movement forwards and upwards of the lower three or four ribs during ordinary inspiration. This is very noticeable when he is sitting up in bed. The least movement, such as the act of sitting up in bed, produces a rapid increase in the rate of breathing, and short, panting respirations. The movement is almost entirely diaphragmatic.

Temperature is subnormal. The pulse varies from 60 to 80. The sputum is scanty, muco-purulent, and contains no tubercle bacilli. The other organs appear healthy in every way.

He was allowed to get up a little, but when doing so his respiratory rate increased considerably. During the latter part of July and August the rate of breathing increased, and was usually between 30 and 50, occasionally going up as high as 60.

His weight on admission was 9 st. 3 lbs., and steadily increased

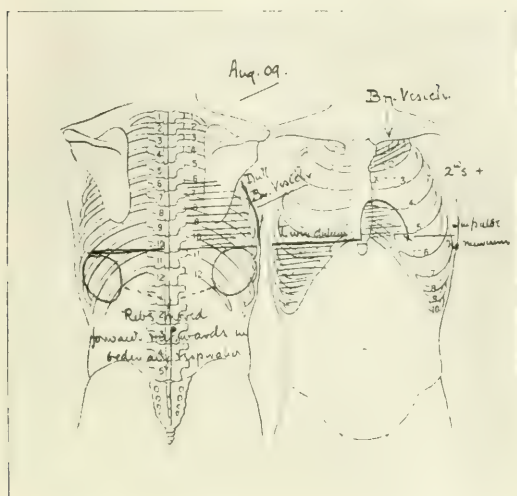


FIG. 1.—Physical signs in August 1909.

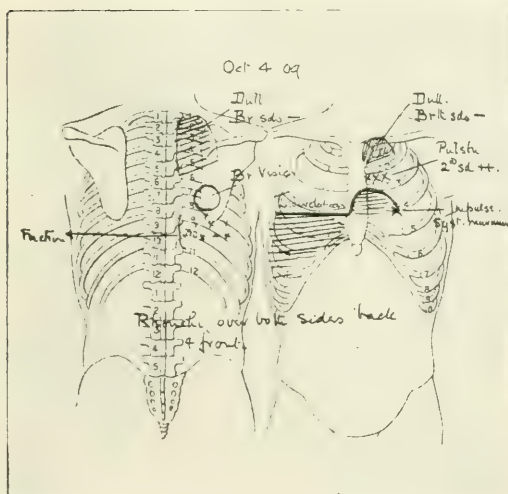
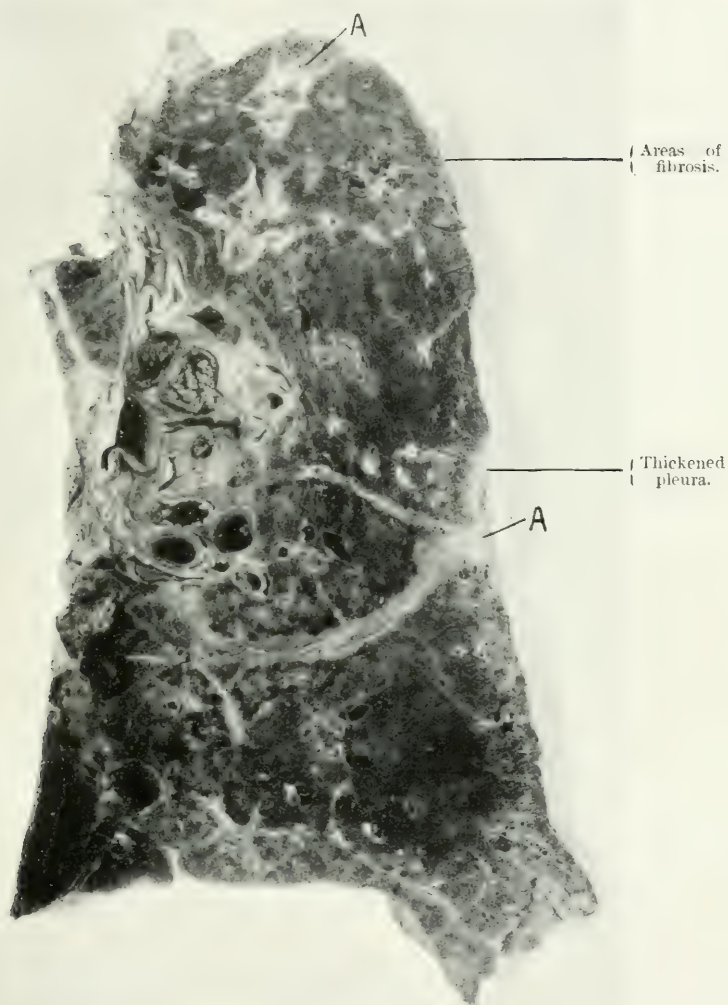
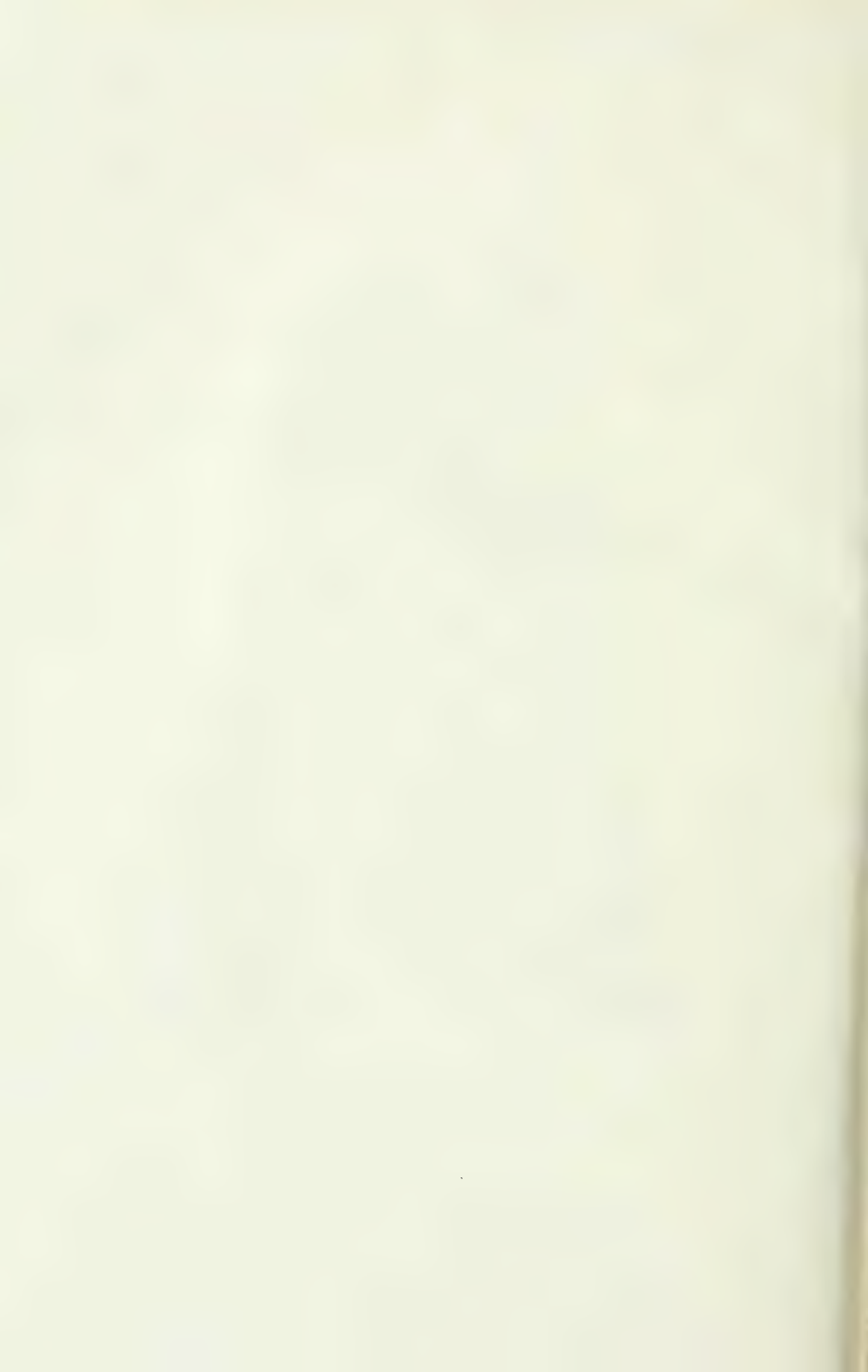


FIG. 2. —Physical signs in October 1909.



Lung. Naked eye. Diffuse interstitial fibrosis.

FIG. 3.—Right lung : shows general diffuse fibrosis. At A, A well-marked fibrous thickening, pleural and interlobar.



until, in August, it was 9 st. 8 lbs. After that it fell to 9 st. 5½ lbs. on 6th September, at which time he was discharged to the hospital annexe in the country, where he remained until 21st September. Whilst there his temperature occasionally went up a little, and he put on weight, but owing to some attacks of dyspnoea he was sent back to hospital on 22nd September, and then complained of some pain in the right side of the abdomen. The cough was rather worse.

On 4th October the chest was again carefully examined, and it appeared even less expansile than before (Fig. 2). There was a patch of dulness over the first left space, about the sternal end of the left clavicle. Visible pulsation over the second left interchondral space, with a markedly accentuated second sound. The liver dulness reached to the fourth space in the nipple line. Impaired resonance over the upper right back. Breath sounds were diminished, chiefly at the right apex behind and the left apex in front. A patch of broncho-vesicular breathing over the angle of the right scapula. Rhonchi all over both sides. Medium-sized râles chiefly at the right base. Slight friction sounds at right base behind.

On 8th October, at 9 A.M., he had a severe attack of dyspnoea whilst in bed. The face became cyanosed; he had to sit up and was considerably distressed. It lasted about ten minutes. From this time onwards the average rate of respiration was raised to between 40 and 68.

17th October. Respiration 60 whilst lying quietly in bed, going up to 76 on sitting up with a bed rest. The lips are slightly cyanosed, and some clubbing of the fingers. Pulse between 80 and 100.

On 23rd October he had another attack of dyspnoea, lasting half an hour. Respiration, 100. Pulse, 120. On 25th October the temperature began to rise, together with the pulse. The respirations varied between 60 and 80, and he died on 28th October.

Pathological Report.—Right lung (Fig. 3) showed a recent fibrinous exudate over the posterior aspect, particularly in the lower lobe; the pleura was markedly thickened over the whole anterior aspect, and posteriorly over the whole of the upper and the upper part of the lower lobe. This thickening was particularly marked at the apex and at the junction of the interlobar septa with the surface pleura, being at this point 3 to 5 mm. thick. The interlobar sulci were obliterated by adhesions.

On section there was very extensive fibrosis, most marked at

the apex, then spreading inwards from the thickened pleura for a distance of about 3 to 4 cm. This fibrosis was also well marked on each side of the interlobar sulci, extending upwards and downwards into the upper and lower lobes respectively for about 5 to 6 cm. In the rest of the upper lobe the fibrosis is present but less extensive than in the above areas. In the lower lobe it is much less extensive than in the upper, but here, too, there are specially advanced areas near the pleural surface and, as stated above, underlying the interlobar sulcus. There is also, at places, definite peribronchial fibrosis.

In the middle lobe the fibrosis is very generalised in distribution and very extensive—the whole surface presenting the appearance of grey granite. White lines of fibrous tissue map out areas of darkly pigmented lung tissue.

Throughout the fibrosed tissue there are numerous small round cyst-like spaces. The bronchi show thickening of their walls, and the vessels are also thickened.

Left lung. The condition is similar but less advanced and less widespread than in the right. The pleural thickening is mainly confined to the upper lobe and the upper part of the lower lobe, and it is beneath the thickened pleura that the fibrosis is most extensive.

Microscopical Examination.—Sections were made from various parts of both lungs, and the description which follows is based upon an examination of all these sections.

There is very marked fibrosis widely scattered throughout both lungs. As a rule the fibrous tissue is dense, but in places it is more cellular. There are scattered foci of small lymphocyte-like cells; these are very numerous, varying in size from 0.5 to 2.5 cm. in diameter. All their cells stain quite readily. There is no evidence of caseation or degeneration, and no giant cells have been observed, nor do these foci contain any bacteria.

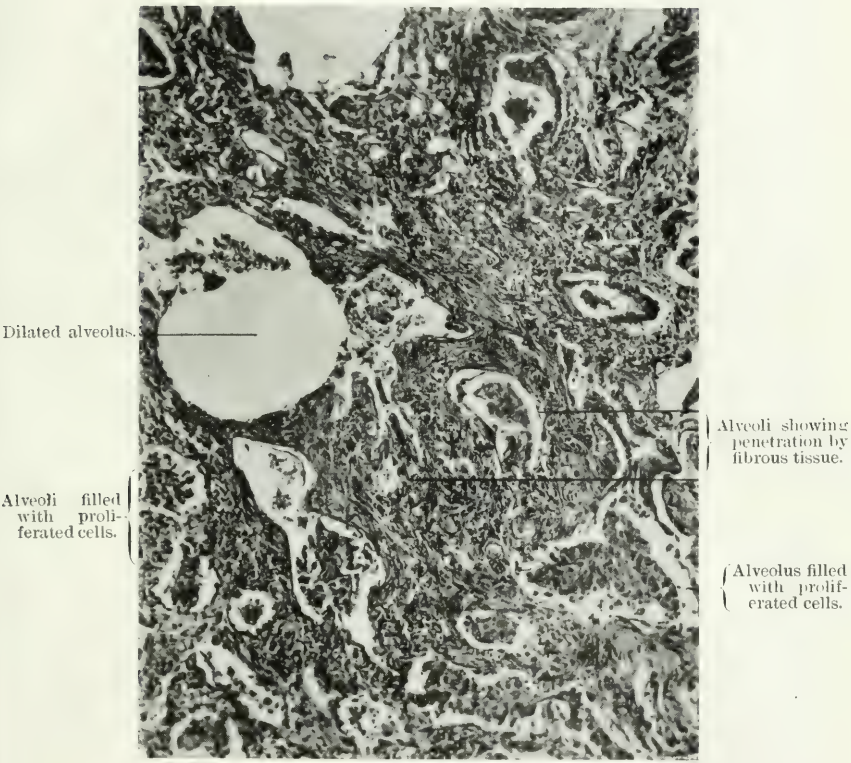
Over large areas, especially in the upper lobes, the fibrous tissue is so dense that the alveoli are completely obliterated; in other parts they are represented by irregular spaces lined by cubical epithelium (Fig. 4). The cystic spaces, described above as visible to the naked eye, are found to be smooth-walled spaces lined by a flattened epithelium, and represented dilated air alveoli—a compensatory emphysema.

There is a good deal of carbon pigment scattered throughout the lungs, and at places the pigmented areas are very fibrous; but, taking it altogether, the fibrous formation is not specially related



Diffuse interstitial fibrosis of lungs. Advanced stage: apex.

FIG. 4.—Section through fibrosed lung showing chiefly scar tissue B, some pigment C, and two remaining alveoli (A A) with cubical epithelium and pigment containing cellular contents.



Dilated alveolus.

Alveoli filled with proliferated cells.

Alveoli showing penetration by fibrous tissue.

Alveolus filled with proliferated cells.

Diffuse interstitial fibrosis of lungs.
Right base: showing early progressive changes.

FIG. 5.—Section through lower lobe of lung, showing active proliferative changes in interstitial tissue and cells penetrating from there into the alveoli.

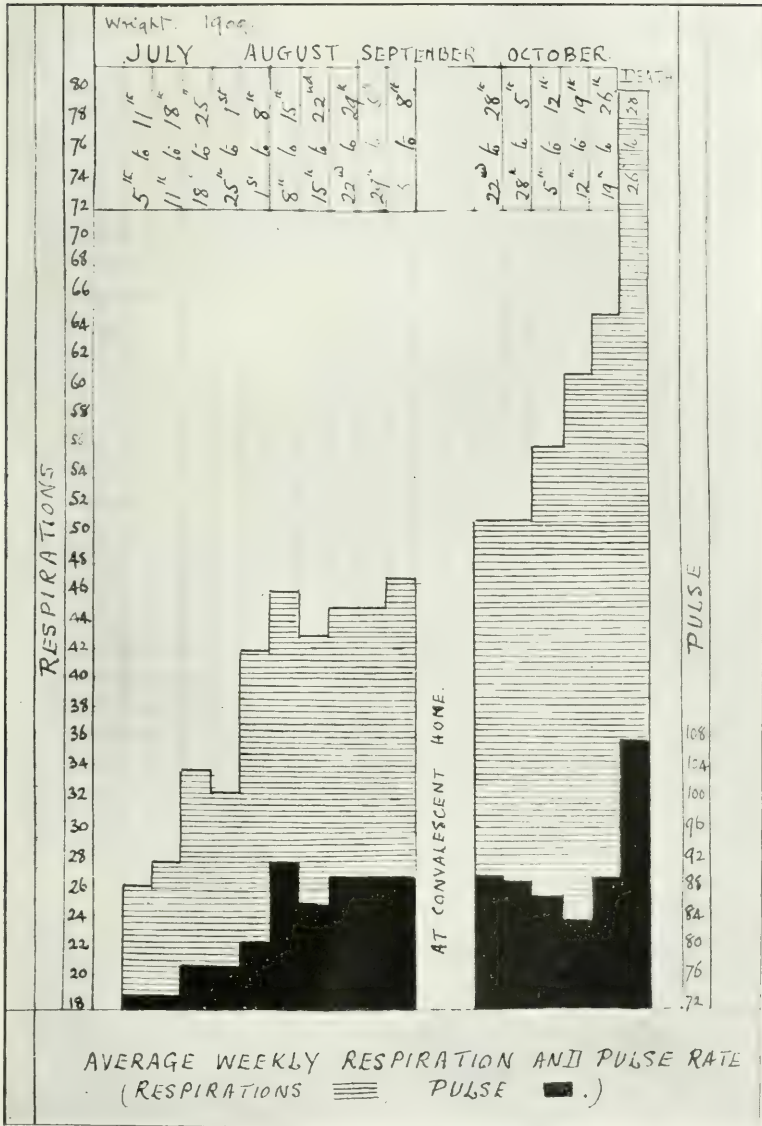


FIG. 6.—Chart showing average weekly respiration and pulse rate

to the distribution of pigment, and in the greater part the fibrous tissue is wholly unpigmented.

The more cellular and progressive areas of fibrous formation show numerous spindle and round cells, and the vascularity of these parts is pronounced. The bronchial tubes in places are filled with exudate, suggesting that they have been obstructed, and the peribronchial vessels at these points are markedly dilated; in other places there is proliferation of the lining epithelium. The vessels, especially the smaller arterioles, at places show thickening of their inner coat, but this change is not widespread or excessive.

Sections from the lower lobe of the right lung, in the neighbourhood of the recent pleural inflammation, show appearances differing in many respects from those seen in the rest of the lungs (Fig. 5). The alveolar structure is much more definite, and most of the alveoli contain exudate. In some, this is fibrinous, with a few mononucleated cells; in most, however, these cells are the prominent feature, and completely fill the alveoli. The cells vary in size and staining reaction, and are apparently largely derived from the lining cells of the alveoli. They form in many places a lining layer of two and three cells in thickness.

The cytoplasm of the desquamated cells is granular vacuolated, and in some instances homogeneous. The latter stain more intensely with eosin. The nuclei show pyknosis and other degenerative changes. The larger cells often contain carbon pigment.

The presence in this part of less definite fibrosis, and the more definite remains of an alveolar structure, together with the very marked proliferative changes in the alveolar epithelium, indicate a progressive condition, and, associated as they are with a localised active pleurisy, suggest an earlier stage in the advancing morbid process, which in passing over other parts of the lungs has left behind the diffuse fibrosis observed. This active stage seems to have begun, or become more marked, whilst he was away at the convalescent home, for he then and afterwards complained of pain in the right side and front of the right chest and upper abdomen.

Remarks.—The records of respiratory frequency during his four months in hospital provide some interesting features. They were usually charted night and morning at the same time as his pulse-rate and temperature; occasionally, however, when he was in any way worse, they were recorded four hourly.

Taking the figures for respirations week by week, and getting the average for that week, it is seen from the diagram (Fig. 6) that

the average rate increased at first steadily from 26.6 per minute on admission, up to about 51 when he was sent away to the annexe. On his return, for the last five weeks of life, the increase still continued, and during the last few days rose to an average of 80 per minute.

During the earlier weeks there was a marked difference in the rates taken whilst in bed in the morning and those taken in the evening, especially if he had been up in the ward; but as during the last few weeks he got worse, this difference became less noticeable, the rate even whilst at rest in bed being almost constant.

The lowest recorded rate was 24, the highest 100. This latter was during an attack of dyspnoea on 23rd October, and was associated with a pulse-rate of 120. Another interesting point was the great fall of respiration-rate during sleep. Thus, on 21st October, when the average daily respiration-rate *whilst at rest in bed, awake*, was 63, the rate when asleep was only 24. This feature was repeatedly noticed. The character of the breathing was striking; rapid, shallow, panting breaths, without any thoracic expansion, not interrupted by coughs, and becoming much more frequent on sitting up in bed, presenting a clinical picture quite unlike anything usually seen. It was not noisy and distressing like that of an acute pneumonia, there was no prolonged expiration as in emphysema, no troublesome cough or wheezing as in the dyspnoea of bronchitis or cardiac disease, no deep breaths or sighing as in the air-hunger of diabetics. It was more suggestive of the breathing seen in cases where there is paralysis of the intercostals owing to a spinal lesion.

The nervous aspect of the respiration was so striking, especially when associated with an absence of sputa and of marked physical signs, that during the early days of his stay in hospital the question arose as to whether it was really a functional nervous affection following influenza.

As has been stated above, the thoracic expansion was extremely reduced. This was shown by measurements taken soon after admission, when the difference in the circumference through the nipples between full inspiration and complete expiration was only half an inch, whilst above the nipples it was only three-quarters of an inch. This absence of thoracic expansion above the diaphragm was in striking contrast with the marked lifting upwards and forwards of the floating ribs on each side during ordinary respiration.

Circulatory System.—The most surprising feature of the case

was the complete absence of any trace of right heart dilatation or hypertrophy. Clinically this was shown by the physical signs of the heart itself and the absence of any signs whatever of permanent venous engorgement. There was no cyanosis, except during his few attacks of extreme dyspnoea during the last few days of life, no venous engorgement, no enlargement of the liver, and no oedema. Associated with these negative symptoms there was a complete absence of orthopnoea.

So far from being propped up in bed, he was most easy when lying flat on his back, and except on the few occasions referred to above, he kept this position. These clinical features were confirmed at autopsy by finding the heart normal in size, and no evidence of engorgement of the liver.

When it is realised that week by week the pulmonary circulation was becoming more and more contracted in area, and that the man eventually died from this cause, the absence of any attempt at compensation in the right heart is difficult to explain. One must assume either that the pulmonary circulation was not actually impeded, or that the heart was incapable of compensating. The latter condition should have caused dilatation of the right heart, which was not found post mortem, and therefore the former alternative seems unavoidable. Seeing, however, the great amount of fibrosis distributed throughout both lungs, it is difficult to understand this being so. It is possible that the absence of any extensive coughing—for both cough and sputum were always slight—prevented that repeated strain on the right heart by forcible expiratory efforts, which in most ordinary dyspnoic cases leads to right heart dilatation and its consequent chain of symptoms.

Another factor may be the early and complete inability to make any muscular effort owing to the extreme dyspnoea produced by the slightest movement. Whatever may be the true explanation, the facts remain anomalous.

The Pulse.—This was in striking contrast to the rate of respiration throughout. In July the ratio P.:R. was 2·7:1; by September it was 1·9:1; whilst for a fortnight before death in October it had reached 1·4:1. The chart of this $\frac{P}{R}$ ratio shows a gradual almost uninterrupted series. The actual average pulse-rate also kept surprisingly low throughout; thus even two weeks before death it was only 84, and the actual week in which he died only 91. It was at no time irregular in force or rhythm.

Temperature.—During the whole time he was under observation this never rose above normal (on one or two occasions it reached 99° F.), until the day before death, when it rose to 100° F. This apyrexial course, associated with the comparatively quiet pulse-rate, pointed to the absence of any toxic effects such as would have been present in tuberculosis, and strengthened the view, which was confirmed by other negative signs during life and at autopsy, that the tubercle bacillus played no part in this disease.

Sputum.—This was practically non-existent during the earlier stages, and even later was never more than slight in quantity, usually mucoid or muco-purulent. There was never any blood present. The cough was not troublesome or violent, and the sputum was not difficult to expectorate.

Urine.—The quantity was distinctly below normal, even for a patient in bed—varying between 800 and 1000 c.c. daily. Specific gravity, 1012 to 1025. Acid. No albumen or sugar. The bowels acted regularly. The appetite was fairly good, and he slept well.

Treatment.—Nothing seemed to have the slightest effect in improving his condition. In fact there was nothing definite to treat. The cough was not troublesome, and all his functions were carried on naturally except that of respiration. Towards the end oxygen was given and afforded some slight relief.

As regards the etiology of this case, we believe that of the known causes of diffuse fibrosis of the lungs we may exclude the following:—

(a) Tuberculosis—on account of the clinical course, the absence of pyrexia, wasting, or sweating, the absence of characteristic sputa and of tubercle bacilli on repeated examination, together with the absence of tubercles in the lungs or other organs at post mortem.

(b) Any form of pneumokoniosis—because of the absence of any sufficient dust in his work, the rapidity of development and the totally different appearances in the lungs, found both naked eye and microscopically, to those familiar to us as a result of dust inhalation.

(c) Syphilis—because (1) he denied absolutely any venereal disease, and was the father of a healthy family; (2) there was no trace of a scar on the glans or elsewhere; nor was there any sign of syphilitic change in any of the viscera; (3) because the lesion was more marked and more advanced in the upper part of the lungs than at the bases.

(d) Pneumonia—because there was no evidence of localised pneumonic consolidation and no history of an attack of pneumonia.

(e) Foreign bodies in the bronchi, localised bronchiectasis, aneurysmal pressure, or mediastinal new growths did not exist.

From the appearances found in the lungs we think that this diffuse fibrosis comes under the head of pleurogenic fibrosis, and from the clinical history is probably of influenzal origin. It seems to have begun in the upper part of the lungs and gradually spread downwards.

With the inflammation of the pleura there has been associated an extension of the process to the neighbouring interalveolar tissue, setting up also proliferative changes in the alveolar epithelium, and as a result a condition simulating catarrhal pneumonia. Gradually the interalveolar fibroblasts have invaded the alveoli more and more until they have practically replaced them, leaving behind a scarred and shrunken lung. Compensatory emphysema has attempted in vain to relieve the difficulties arising therefrom.

We have failed to find any record of a similar case ascribed to influenza. Considering the enormous number of cases of this disease during the last twenty years, the association, if real, must be extremely rare. The case of diffuse symmetrical pulmonary cirrhosis reported by Percy Kidd¹ resembles our case in many ways, as does also a case by M'Collom,² but in the latter there was a history of syphilis. Both of these preceded the reappearance of epidemic influenza in 1889.

For the photo-micrographs we are indebted to the kindness of Messrs. Arthur Connell and Graham Simpson.

REFERENCES.

¹ Kidd, *Trans. Pathol. Society*, 1886, p. 126.

² M'Collom, *Boston Med. and Surg. Journ.*, October 1885, p. 420.

I.

THE CARE OF THE INFANT AND YOUNG CHILD
(TO FIVE YEARS) IN EDINBURGH.

By A. DINGWALL FORDYCE, M.D., F.R.C.P.,
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As Professor Holt¹ has said, "It may not be true in adult life, but in infancy money may purchase not only health, it may purchase life, since it puts at the disposal of the infant the utmost resources of science, the best advice, the best food, and the best surroundings for the individual child. To relieve, or even greatly to diminish, infant mortality, these basal conditions of modern city life—poverty and ignorance—must be attacked."

Poverty and ignorance, in so far as they relate to the welfare of early child-life in Edinburgh, is, I am well aware, a very comprehensive subject, and in view of the nature of the development of relief agencies at the present time, I am convinced that it is necessary that emphasis should be laid upon the medical side of the question, if such agencies are to be fully efficient.

More particularly is this true of early childhood, and especially of the years before the period of school life is reached—the first four or five years of life. The development of the medical inspection of school children is almost universally admitted to be bearing good fruit, but I have it on the authority of a distinguished medical officer of health in our own country that there "is urgent need for an association which will take up the children before school age."

During these early years growth and development are more marked than at any other period of life—physically and mentally the normal child progresses by leaps and bounds. At this time it is inevitable that his association with his guardian be of the closest and most intimate nature, and throughout these years the home environment is one of the most powerful factors in determining his condition of health or sickness.

The pressing needs of this period may be summed up as—
(1) Close womanly attention; (2) reliable supply of milk; (3) fresh

¹ *Journal of Amer. Med. Assoc.*, 26th February 1910.

air and warmth; and (4) the avoidance of infection, such as, for example, the presence of a phthisical person in the house.

In how far are these needs, generally speaking, supplied in Edinburgh for children of the poorer classes of society?

In the cases of 645 children seen at the New Town Dispensary, I have noted¹ that 226 (35 per cent.) were bottle-fed, or nursed at the breast for less than six months; and while, so far as I know, there is no reliable estimate of the work done by pregnant and newly-delivered women in the town, yet one cannot work at a children's out-patient department for a series of years without realising that, in addition to home duties, in no inconsiderable number of cases, the burden of supplying the income wherewith to keep the household together rests, to a large extent, on the shoulders of the wife and mother.

With the best will in the world satisfactory maternal suckling is, not infrequently, impossible—it may be the call to work, or it may be physical debility—whatever the cause, the fact remains.

And, naturally, we look next to the condition of the milk supplied in the town. In fifty samples of milk, obtained from the more outstanding dairies in Edinburgh and Leith, I found² the percentage amount of fat was in one case as low as 1·8 per cent., and in one case as high as 6·2 per cent., while the amount of solids, other than fat, varied from 6·25 per cent. to 10·95 per cent.

One is, therefore, justified in saying that the chemical composition of the best milk in the town varies enormously. We, consequently, cannot tell, without elaborate analysis, within rather wide limits, what is the composition of the fluid in the baby's bottle, and a change from one dairy to another almost certainly means marked alteration of the baby's food.

Again, this milk teems with micro-organisms.

Dr. Hunter Stewart, in the Annual Report of the Public Health Department of the City of Edinburgh for 1908,³ gives the bacteriological contents of samples of milk as delivered to the retailers in 1906 as:—Town milks, 223,000 micro-organisms per c.c.; country milks, 180,000; and railway milks, 541,000. As a contrast to these figures he takes the average of forty-six samples “as representing what can be easily attained when the

¹ *Lancet*, 27th January 1906.

² *Edin. Med. Journ.*, September 1908.

³ By A. Maxwell Williamson, M.D., B.Sc., Medical Officer of Health.

cow is milked with ordinary precautions, and in the usual routine fashion in a byre, and not in a special milking-shed." The figure for these forty-six samples is 9150 micro-organisms per c.c. It has, of course, to be realised that these last samples were tested, on an average, three-quarters of an hour after the time of milking, whereas the previous figures applied to milks always several hours old.

To compare procedures adopted for keeping milk, shop samples of milk which had not undergone transit by train, and which were not more than ten hours old, were compared with samples taken from byres and kept at definite temperatures. The results showed that in shop samples the number of micro-organisms per c.c. was 505,800, whereas in samples taken from the byres and kept ten hours at 50° F. the number was 39,680, and in samples taken from the byres and kept five hours at 50° F., and five hours at 60° F., it was 58,000.

He says: "The total number of micro-organisms in a milk is, I think, valuable as a measure of the general conditions under which it has been produced, and the temperature at which it has been kept. . . . In the light of the bacteriological condition of the forty-six samples of milk which I have taken as a standard for comparison, and in the production of which no extraordinary care was taken, it is difficult to understand why the milk from town and country byres, as delivered to the milk shops in the morning, should show so great bacterial contamination within four or five hours of milking, even though not cooled. . . . One explanation suggests itself, namely, that the milk delivered in the morning consisted, in some cases, partly of milk which had been milked the previous evening, and not cooled. The bacteria in the previous evening's milk would have greatly increased in the interval, and its mixture with the warm milk would accelerate their growth. If this be so, it is only another proof of the necessity for cooling all milk to at least 50° F. shortly after its production. The condition of the milk vessels is also of great importance. It should be clearly realised by all those engaged in the production and handling of milk that what is popularly called cleanliness is not sufficient in the case of milk vessels, and that scrupulous care in the washing and, later, scalding of the vessels is necessary.

"To prevent contamination from dust, &c., milk should not be kept in the milk shop in open vessels. It also should be kept as cool as possible, either artificially at 50° F., or in the coolest part of the milk shop.

"The measures I have suggested are simple. It may be urged that their adoption would increase the price of milk. I do not know that it necessarily would, but even if it did slightly increase the price, the benefits obtained would be a compensation. To the milk seller it would be an advantage. No preservatives would be required, no scalding would be necessary, and there would be no loss from milk becoming sour and unsaleable. Much work is at present being done in this subject, and, as a result, it is becoming more and more recognised that measures such as are suggested in this report are absolutely necessary if the degree of cleanliness of the milk supply which the public have a right to expect is to be attained."

This degree of cleanliness has not yet been obtained, and we are bound to recognise that herein lies a very serious danger to health in early childhood.

In his Annual Report, just published for the year 1909, Dr. Williamson, Medical Officer of Health for Edinburgh, says: "The closest attention has, as hitherto, been devoted to the detection of any form of tuberculous disease affecting dairy cows, and particular importance attaches to the result of these examinations, owing to the fact that a larger number of animals with tuberculous udders have been discovered than in any previous year. When it is stated that no fewer than thirty-seven cows which had been contributing to the city's daily milk supply were ordered to be removed owing to their tuberculous condition, the importance of the circumstance in its bearing on the prevalence of tuberculosis among the citizens cannot be overestimated.

"In thirteen of these cows the udders were affected, and in every one of these cases the milk they were yielding was proved to contain the tubercle bacillus. The knowledge that such fruitful sources of infection have been discovered, though disconcerting in itself, should prove a ready and useful guide towards explaining one, at least, of the probable modes of propagating this disease.

"I have referred to this matter at length in previous reports, emphasising the total inadequacy of the powers at the disposal of the local authorities for effectively ensuring that protection against further danger from an ascertained source which the community are entitled to expect, and which can only be secured by the immediate destruction of the infected animals."

Passing for the moment from the subject of the milk supply, I find, from the Annual Report for 1908 already quoted, that the

infantile mortality rate in Edinburgh for that year was 114 per 1000 births, as compared with 121 per 1000 during the preceding years, and 147 per 1000 ten years ago—very satisfactory figures from the comparative point of view. I also find, from a diagram setting forth the relative infantile mortality rates in thirty large towns in Great Britain, that many of these show a rate of from 130 to 150 per 1000 births; several others show a rate varying from 115 to 130 per 1000 births; while of those towns here selected only six show a rate less than that in Edinburgh—these towns being Southampton, London, Derby, Huddersfield, Brighton, and Portsmouth.

Now poverty as one of the great causes of infantile mortality is closely associated with the subject of housing, and in such comparisons as those just made it is important to remember that Edinburgh is largely a residential city. Dr. Williamson says, in speaking of the infantile mortality rate, “in spite of the fact that Edinburgh compares favourably with other cities, the existing conditions cannot by any means be regarded as satisfactory.”

In a table giving the numbers of houses, with their rentals, in the various wards in the city, I find that of a total of 71,000 houses, 22,000 have a rental of over £20, and that of those houses with a rental of over £50 the great majority are in the wards of Newington, Morningside, and Haymarket. From another table I find that the infantile mortality rate in these three wards is respectively 54, 38, and 102 per 1000 births.

The other side of the picture is disclosed by Dr. Williamson, as follows:—“From those wards which showed a high general and infantile death-rate, I selected a number of areas capable of being readily identified, and subjected these to a careful scrutiny, so as to arrive at a correct figure as representing the infantile death-rate within the area defined.

“The highest figure is reached in an area in St. Giles Ward containing the High Street (from Bank Street to St. Mary Street) and the closes contiguous thereto. The infantile mortality here is at the rate of 232 per 1000 births, or rather more than double that of the city as a whole.

“If the Cowgate be taken, along with its environs, as forming another area which would include Tron Square and Waverley Buildings, the rate thus obtained would be 216, whereas, if the Cowgate be taken separately, it yields a death-rate of 344, which is decidedly the worst met with in the process of compiling these figures.

"Only slightly better than the area just referred to is that comprising Grassmarket, West Port, and adjacent streets, with a rate of 214. The Greenside area shows a death-rate of 184, and the Lawnmarket, with the courts and closes there, gives 170 per 1000.

"Following on this is an area composed of Richmond Streets, North, South, &c., Richmond Court and Place, and Oakfield Court, where the rate is considerably lower, the actual figure being 155. This district is contained in St. Leonard's Ward, where the rate is 130.

"The South Back Canongate furnishes another suitable area, which includes Holyrood Square, St. John Street, &c., and here the rate is 149. The next area to be compared is taken from St. Andrew's Ward, and I have selected St. James's Square and the streets in its immediate proximity. This area returns a mortality of 136 per 1000, and if an individual street is selected from the group, namely, North St. James's Street, the figure rises to 286."

Regarding the subject of the opportunities of infection offered to young children in the town, it is almost impossible to determine precisely the risks run as they compare with those in other cities. I would, however, briefly allude to figures obtained by Dr. John Thomson and myself,¹ relative to the prevalence of abdominal tuberculosis, as being highly suggestive:—"While of 67,489 children treated in hospitals in England and Scotland (elsewhere than in Edinburgh and Glasgow) the percentage amount of abdominal tuberculosis was 1·6, of 68,498 children similarly treated in various Continental countries it was 1·13; and of 37,129 American children's hospital patients it was only 0·28; yet among 23,939 children treated in Edinburgh and Glasgow the percentage was no less than 3·9. In no other centre or centres do the figures even approach those of Edinburgh and Glasgow, the nearest being those from Buda-Pesth, which show a percentage of 2·0 in 27,173 children."

Enough has been said to show that, looked at as a whole, Edinburgh takes no mean place in comparison with other cities as regards the welfare of her youngest citizens, but that even such an honourable position is compatible with a huge, unnecessary loss of life in early childhood.

What are the agencies in Edinburgh for ameliorating the conditions?

¹ "On the Relative Prevalence of Abdominal and Meningeal Tuberculosis in Children in Different Countries, as shown by Clinical Hospital Statistics."—Kelynack, *Tuberculosis in Infancy and Childhood*, 1908.

The secretary of the Charity Organisation Society writes, giving me the names of the following agencies:—The Health Visitors; Day Nurseries; Children's Shelter; Society for the Prevention of Cruelty to Children; Free Kindergartens; Boarding Homes for Widowers' Children; Donaldson's Hospital; Church of Scotland Orphanage; Quarrier's Homes, Bridge of Weir; Red House Home, Musselburgh; Orphan Hospital, Dean; and there are also several more, among which may be mentioned the Cripples' Home; Gilmerton Convalescent Home; and the Leith, the Kinghorn, and the Humble Holiday Homes.

The agencies are many, and most of them merely require mention.

Dr. Williamson, in his report already quoted, says, "The special efforts which have been initiated in order to effect a reduction on the infantile mortality rate have been attended with a considerable amount of success.

"The first step, of course, towards the attainment of this object was reached when the Notification of Births Act came into force at the beginning of the year, as it is an essential preliminary, in dealing with this question successfully, to have the earliest possible information in regard to all births.

"With the view of taking the fullest advantage of the Act, it was deemed necessary to have notices sent to every householder in the city, directing attention to its provisions, with the result that intimation in regard to so large a number as 90 per cent. of the total births has been received within the time limit. The next step taken by your local authority was the important one of appointing a lady health visitor, and this was immediately followed by the inauguration of the specially satisfactory efforts which are now being carried out by the large body of voluntary health visitors, who are carrying on so splendid a work in the visitation of all newly-born infants in the poorer districts of the city. . . . The procedure adopted is along the following lines. The notifications are, on arrival, passed to the health visitor, entered in the register kept for this purpose, and then handed on to be sorted out in registration-districts preparatory to compiling the returns for registrars. From the office register such addresses are extracted as may require attention. The health visitor calls in person on these, and, where the circumstances seem to warrant future observation, a card is forwarded to the secretary, who, in turn, allocates these to the visitors. These visitors meet at stated intervals to report on the cases under their care, and

to have any circumstances affecting the health of their charges recorded in the books kept for that purpose."

A report by the voluntary health visitors has been published for the year 1908-9. In it, it is stated that "the principles observed in the organising of the voluntary help have been these:—1. The utilising of visitation as already found, and, 2. Co-operation with existing educational, medical, and relief agencies."

In the rules it is laid down that—"In all cases the visitors shall encourage the mother to nurse the child herself. If the child is not thriving, the visitor may verify this by having the child weighed at the Hospice, 219 High Street, and, if necessary, directions should be given the mother regarding her own diet. In the case of the child continuing to lose weight, the family doctor should be called in, or the child sent to the Sick Children's Hospital, or to a Dispensary. In no case shall a visitor advise a mother to cease nursing her baby without the approval of a doctor. All children on artificial feeding should be weighed regularly at the Hospice."

The education of the visitors in the elements of hygiene and prophylactic medicine is being attended to, and classes on a variety of subjects are being held for mothers.

"In January 1909 the medical committee of the Hospice arranged that infants under the charge of the Voluntary Health Visitors might, when necessary, be weighed at the Hospice. . . . At the weekly weighings the mothers are given advice as to the feeding and care of their infants, every effort being made to encourage breast-feeding.

"Arrangements have also been made for the weighing at their own homes of infants which cannot be brought to the Hospice. . . . A report of the condition of the infants weighed is given at the fortnightly meetings of health visitors.

"In connection with the Hospice there is also carried on a milk depot for the purpose of providing a supply of pure milk for infants' use at a moderate price. In the first half of the year the milk used was Buddeised milk, but in the end of July this was given up, and the milk now given out is undiluted pasteurised milk from tuberculin-tested cows. The milk is supplied by the company which supplies the City Hospital, and the dairies and byres are subject to the inspection of the Medical Officer of Health of Edinburgh.

"The milk is put up in sealed bottles in wire baskets. Each bottle contains one feed of milk, and the baskets contain a suffi-

cient number of bottles for one day's use. The milk is supplied at the rate of from one shilling to two shillings per week."

The Edinburgh Day Nurseries Association have under their charge four day nurseries. "These nurseries are open daily, Sunday excepted, from 6.30 A.M. till 6.30 P.M., and on Saturdays from 6.30 A.M. till 4 P.M. A charge of threepence per day is made for each child, infants under eighteen months fourpence. In the case of two or more in one family a reduction of a halfpenny per child after the first will be made. The matrons may make further reductions when a child is only left for part of a day."

During the year 1909 the attendance numbered 24,641.

Such being briefly and in outline the nature of the agencies at work in Edinburgh, it is of value, before proceeding to bring forward suggestions, shortly to consider the nature and methods of work of agencies elsewhere, to note the degree of co-operation in each of these localities, and the position taken up by the medical profession.

(To be continued.)

ACUTE PANCREATITIS, CONSIDERED IN RELATION TO
THREE CASES OCCURRING IN GENERAL PRACTICE.

By R. J. DICK, M.D.

It is the object of this paper to discuss some aspects of acute pancreatitis in relation to three cases observed during the last five years, and if it be objected that the small number of the cases in question renders conclusions drawn from their consideration unprofitable, it may with some justice be maintained that the disease is apparently not frequently met with, or, if met with, not always recognised, and is accordingly, for practical purposes, a rare disease; and that it is only by detailed discussion of even isolated cases, when identified, that the natural history of such a disease can be followed out and treatment agreed upon.

In the present series the diagnosis was established in all cases; in one by post-mortem examination, and in the others by operation during life.

DESCRIPTION OF CASES.

CASE I.—A. B., male, æt. 44, a publican, was well known to me prior to his present illness, and was definitely alcoholic in his habits.

I was called to see him on 12th April 1905, and found him in bed suffering from epigastric pain, obviously very severe.

The pain was constant, but with paroxysmal exacerbations, and its severity was of a degree altogether exceptional; he showed signs of profound shock, there was general clammy pallor, and his pulse was hardly to be felt. Temperature 97.4° F.

On inspection of the abdomen there was some limitation of movements on respiration, but this was not pronounced.

On palpation there was no well-marked general tenderness in the epigastrium, and no definitely localised tender spot; steady pressure tended to relieve the pain.

The condition appeared to me to be unusually severe biliary colic, although I had never from previous experience known him to be harbouring gall-stones. A full dose ($\frac{1}{2}$ gr.) of morphia was given hypodermically, but to my great surprise failed to give any relief; $\frac{1}{4}$ gr. was therefore given an hour later, again without relief; the pain and collapse were unaffected.

On the second day of the illness the condition was the same,

with certain symptoms added—notably great restlessness and intense thirst. The former was very noticeable, and it was an altogether unusual thing to see a man so profoundly ill—with no pulse at the wrist, and collapsed—attempting to get out of bed apparently with the idea of getting relief from pain by change of posture. Once again morphia failed to relieve, although repeated until a grain had been given hypodermically in twenty-four hours, the initial dose being again $\frac{1}{2}$ gr. There was considerable nausea, and occasionally small quantities of bilious vomit, but vomiting was at no time a striking symptom.

On the third day there was to be observed some circumscribed swelling in the epigastric region above the umbilicus. There was complete constipation, but flatus could be passed, and there were not present the signs of intestinal obstruction.

By now it was borne in upon me that I was witnessing a combination of clinical symptoms which I had never previously seen, and constituting to me a new disease.¹

On the fourth day the severity of the symptoms as regards pain and collapse had slightly abated; the pulse returned at the wrist, and was feeble, rapid (112), and of low tension. Temperature 98.8° F. Still no action of the bowels.

Fifth day and afterwards: Improvement was gradually maintained; the bowels were moved on the seventh day—a large greenish slimy evacuation.

On the tenth day he was able to be out of bed, and although very weak, was comparatively well.

This initial attack lasted from the 12th to 21st April.

Subsequent History from 20th April to 21st June.—After 20th April he gradually recovered strength and resumed his ordinary occupation. The only persisting symptom which I noted was “*pain in the back*,” brought on by stooping while working in the garden. The pain was in the lower dorsal region, and not acute—more of a dull ache, and always brought on by continuous stooping.

On 20th June I was again summoned, and found him in acute pain and collapse, which lasted for twenty-four hours, and terminated fatally, all palliative treatment being again unavailing; the symptoms were identical with those occurring on 12th April.

Post-mortem Examination.—The abdomen only was investigated. There was no general peritonitis. The liver showed signs of the early fatty stage of cirrhosis. The gall-bladder contained no gall-

¹ Cf. Halsted, *J. H. H. Bull.*, 1901, Nos. 121, 122, 123.

stones, nor were any to be found in the cystic and common ducts. The fat in the root of the mesentery and omentum was here and there converted into soft lumps of the consistency of butter. The lesser sac of the peritoneum was distended and full of turbid chocolate-coloured fluid, and floating free in this fluid were dark lumps of old and recent blood-clot, and tougher masses consisting of gangrenous pancreatic tissue.

The pancreas was disorganised; parts of it were soft and pulpy, other parts tough and indurated; there were areas showing old and recent hæmorrhage.

Microscopic Examination of the Pancreas.—Difficulty was experienced in securing a portion of the gland, which was not hopelessly necrotic, for microscopic examination. On examination, however, early and later inflammatory changes were found; the former evidenced by small round-celled infiltration, and the latter by overgrowth of fibrous tissues.

Crystals of hæmatin are distributed throughout the specimen.

The glandular element shows great disintegration, part of which may have been due to post-mortem changes.

Comments.—This case interested me greatly, the disease being to me entirely new. I had never previously met with a case presenting the same clinical picture, and was at the time unacquainted with the available literature dealing with the condition. Hence the original erroneous diagnosis of gall-stones. Subsequent study of the subject has shown me that others have made the same mistake for the same reasons, viz. lack of experience of actual cases, and ignorance of the literature dealing with such. The salient features observed during the early days of A. B.'s illness were—(1) The intensity of the epigastric pain and the conspicuous failure of large doses of morphia to relieve it. (2) The profound and continued depression of the circulation, never previously met with in my experience to such an extent, except in a moribund person. (3) The combination with this depression of active motor restlessness and mental clearness. (4) The absence of clear evidence, either from signs observed or from my knowledge of the previous history, of ordinary abdominal emergency lesions, *e.g.* perforated gastric or duodenal ulcer, fulminating appendicitis, acute cholecystitis, or acute intestinal obstruction. (5) The temporary recovery—practically without treatment—from what looked like a mortal illness. (6) The unusual post-mortem appearances.

CASE II.—C. D., male, æt. 44, gardener.

A month after the death of the first patient, while the impressions gained were fresh in my memory, I saw C. D. in consultation with a colleague who was in charge of the case.

The man had hitherto been robust, but there was a clear history of alcoholic excess. On a Sunday evening in July 1905, at 6 P.M., he was quite well. At 8 he was seized with intense abdominal pain. I saw him on the Monday, and helped to carry him from his bed to a stretcher, on which he was removed to the Cottage Hospital. The provisional diagnosis made by my colleague was that he was suffering from perforative peritonitis, demanding laparotomy; the general signs of collapse were well marked. I remarked that the case reminded me strongly of Case I.

Laparotomy was performed the same evening, and subjoined are the notes of the surgeon who carried out the operation.

"The abdomen was opened through the right rectus muscle; a few ounces of blood-stained fluid escaped; the intestines were injected and slightly distended. There was œdema of the cellular tissue in the region of the pancreas, and areas of fat-necrosis in the omentum and mesentery. The abdomen was closed without drainage."

Subsequent History.—The effect of the operation was at once to produce relief of symptoms, and recovery was rapid and complete.

A few weeks ago I sought out the man and found him in apparent vigorous health pursuing daily his occupation as gardener. During the last five years he had two days' illness—abdominal pain—for which he did not seek medical aid. I secured a specimen of his urine, which, from recent research (to be further discussed), is of interest. The subjoined report by Dr. P. J. Cammidge shows that it exhibits the "pancreatic reaction."

Reaction, acid; sp. gr., 1.006; albumen, nil, some nucleo-proteid; sugar, Fehling—no reduction, phenylhydrazin—some small rosettes of crystals, Bial's reagent—slight green, spectroscopical examination shows two faint bands in the red; acetone, nil; aceto-acetic acid, nil; indican, nil; bile, nil; urobilin, nil; blood, nil; urea, subnormal, 0.71 per cent.; chlorides, subnormal, 0.26 per cent.; phosphates, subnormal, 0.05 per cent.; microscopically, some uric acid crystals, a few small calcium oxalate crystals, some yeast cells; pancreatic reaction, C., a few fine crystals, soluble in 5 to 10 seconds.

Although this specimen contains no appreciable quantity of reducing sugar, the results of Bial's reaction and the phenylhydrazin test suggest that it contains a trace of pentose or a marked excess of glycuronic acid. The absence of any marked reaction for indican, with which the glycuronic acid is most commonly combined, is, however, against the latter. The results of the pancreatic reaction point to there being some slight active degenerative changes in the pancreas at the present time. The absence of bile pigment shows that there is no obstruction to the free flow of bile into the intestine, and the negative result of the urobilin reaction is against there being any serious interference with the functions of the liver or cholangitis such as usually accompany the presence of floating gall-stones in the common bile duct. The presence of only traces of indican is against there being any abnormal putrefactive changes in the contents of the upper part of the intestine, with catarrh of the walls, to which the pancreatitis might be secondary. The presence of small calcium oxalate crystals in the centrifuged deposit tends to confirm the diagnosis of chronic pancreatitis, and suggests that the condition is of some standing.

Comments.—(1) As in Case I., we have here the initial intense pain in the upper abdomen, with an absence of facts in the previous history pointing to any obvious cause for it, such as gastric or duodenal ulcer, cholecystitis, or biliary colic. (2) Complete relief and apparent cure following laparotomy.

CASE III.—Lady, *æt.* 45, in good circumstances.

This case was under the care of my partner, and was seen by me along with him during the course of her illness, which terminated fatally in forty-eight hours.

The following notes represent my partner's previous knowledge of her medical history since she came under his care, and our joint observation of her last illness:—

She was a particularly vigorous woman, physically and mentally. Her only notable malady during the past six years was oxaluria, which produced symptoms of slight renal colic, and yielded easily to general treatment, largely dietetic.

The history of oxaluria is significant in this case in view of Cammidge's researches.

One morning, on waking, she had slight pain, which she put down to indigestion. She went to do some shopping, and while so engaged was suddenly seized with severe abdominal pains,

and had to return home; on the way she vomited. On examination at midday she looked ill, and complained of severe pain in the epigastrium, also over the lower part of the sternum, and along each parasternal line. There was no marked rigidity of the recti; pressure did not increase or diminish the pain. Morphia was given on the supposition that she was suffering from biliary colic; it did not produce relief.

In the evening her condition was unaltered; the pain, which was kept under by chloroform, was now also felt in the back—lower dorsal region. The pulse was just over 100, and of poor quality; the temperature was normal; there was no evidence of intestinal obstruction; during the night the general condition got worse, and in the morning a surgeon was summoned. By this time there was dulness on percussion in the left epigastric region and left hypochondrium; there was also a slight degree of general cyanosis.

The surgeon decided to perform laparotomy, since, although the clinical signs were highly suggestive of acute pancreatitis, it was difficult to exclude perforated gastric ulcer.

Surgeon's notes of the operation:—"The lesser peritoneal sac was full of blood-stained fluid; there was much fat-necrosis. There was no evidence of any gall-bladder complication, and no sign of any gall-stones in any part of the bile ducts. The pancreas was a soft pultaceous mass, and there was no sign of tension within its capsule. The appearance suggested more of a sloughing condition than anything else. A drainage tube was passed down to the site of the pancreas, and the abdomen was closed."

The condition of the patient after operation showed no improvement; cyanosis became more marked, and she gradually sank, and died from cardiac failure, retaining consciousness till shortly before death. No post-mortem examination was obtained.

Comments.—(1) The onset of the illness was rather less sudden than in Cases I. and II. (2) Cyanosis was a well-marked symptom, as in Halsted's case. (3) Laparotomy and drainage afforded no relief. (4) There was a history of oxaluria; this was the only fact of positive help in pointing to a diagnosis so far as the previous history was concerned.

ETIOLOGY AND PATHOLOGY OF ACUTE PANCREATITIS.

Preliminary Considerations.—Before entering upon this discussion it may be profitable to try and arrive at some clear notion of what the disease essentially consists in, considered clinically.

and for this purpose the above three cases are sufficient. There is, to my mind, in the literature dealing with the subject, far too great a tendency to try and "bring the disease into line" with other acute inflammatory affections, such as, *e.g.*, appendicitis and perforating gastric ulcer.

Now, to put it briefly, the common "abdominal catastrophes" tend to be fatal because they are infective, *i.e.* organismal, and speedily lead to general peritonitis; and since in the above three cases general peritonitis was absent, it is evident that the disease under consideration cannot *completely* be "brought into line" with the ordinary acute inflammatory abdominal conditions. Attempts to do so in defiance of obvious clinical discrepancies with the latter are unscientific, and from the point of view of diagnosis and treatment they are, in practice, mischievous.

On the subject of acute pancreatitis Fitz was a pioneer.¹ His monograph ought to have focussed the attention of all practitioners on the disease; and it is astounding that, although Fitz wrote in 1889, it is only during the last decade that the subject has aroused, in this country at least, much active interest and investigation.

Nevertheless a study of Fitz's paper makes me think that he was not free from the modern tendency to try and "bring the disease into line" at the expense of obscuring its conspicuously "*outré*" character.

Under Diagnosis he says: "The symptoms are essentially those of a peritonitis beginning in the epigastrium and occurring suddenly during ordinary health without obvious cause." This does not seem to cover the ground so far as the above three cases are concerned.

In them the early symptoms were:—(a) Hyper-acute epigastric pain, without that notable rigidity and tenderness characteristic of peritonitis. (b) Profound circulatory depression amounting to that seen in surgical "shock," and continued for a period much in excess of that approached in any ordinary abdominal catastrophe. I could imagine this circulatory depression as being comparable clinically to the effects of snake-poison.

The object of the preceding remarks is to make clear that, however constantly the symptoms and the pathological appearances, ante mortem and post mortem, are partly those of an acute inflammation of the pancreas, the disease consists very largely in the remote effects of this process—without general peritonitis.

¹ Fitz, *New York Medical Record*, 1889.

and this ought to be borne in mind when discussing etiology and pathology.

Etiology.—The main causes discussed in the literature are:—

- (1) The effects of gall-stones. (2) Infection from the duodenum.
- (3) Hæmorrhage.

Other causes such as embolism and infarction, trauma, metastasis in mumps, it is not proposed to discuss here.

1. *The Effects of Gall-Stones.*—A study of the literature dealing with acute pancreatitis shows that there is a strong consensus of opinion that gall-stones are a pre-eminent mechanical factor in producing the disease. Consideration of the three cases described above, in all of which gall-stones were absent, shows, I think, conclusively that, however potent a cause cholelithiasis may be in producing many cases of acute pancreatitis, the latter cannot be said to be essentially dependent on the presence of gall-stones or their mechanical effects.

The case of Halsted¹ investigated by Opie² is in this connection a classic.

Opie found on post-mortem examination that there was present in the ampulla of Vater a gall-stone partly filling it, so as to prevent bile from flowing into the duodenum, but not of size sufficient completely to fill the ampulla; so that the bile failing to flow into the duodenum was diverted past the calculus into the duct of Wirsung, the common bile duct and the duct of Wirsung being converted into a continuous channel.

Evidence of the bile having actually reached the duct of Wirsung was found, the walls of the latter being bile-stained.

Opie therefore concluded that acute pancreatitis had been caused in this case by "retrojection" of bile along the duct of Wirsung owing to the mechanical conditions present due to the gall-stone partially filling the ampulla of Vater whereby the bile was diverted from the common bile duct along the duct of Wirsung. Flexner³ subsequently proved by actual experiment on dogs that injection of bile into the duct of Wirsung produced in them acute pancreatitis. Opie's case, however interesting, is not, to my mind, convincing, for the following theoretical reasons:—

It is admitted that gall-stones are exceedingly common, and in many cases they are frequently passed into the duodenum and

¹ Halsted, *op. cit.*

² Opie, *B. J. H. H.*, 1901, xii. 182.

³ *Journal of Exp. Med.*, January 1906, v. 167.

can be recovered from the faeces. It must surely happen that whenever a gall-stone is passing into the duodenum through the ampulla of Vater, a stage in its transit must be reached—and the process might be arrested for a time at that stage—when it produces the conditions discovered in Opie's case, viz. of only partly filling the ampulla, and thus converting the common bile duct and duct of Wirsung into a continuous channel.

Retrojection of bile might therefore occur in every case of gall-stones when a stone was being passed into the duodenum, even if the necessary conditions as affecting the junction of the common bile duct and the duct of Wirsung only lasted for a few minutes.

2. *Infection from the Duodenum.*—It is suggested that the infection arises because of the existence in the duodenum of chronic catarrh.

In this connection may be mentioned the point of alcoholism; in two of the above cases this was well marked, and both the patients suffered from gastro-duodenal catarrh, largely no doubt due to alcohol. When, however, one considers the enormous number of people who suffer from gastro-duodenal catarrh, alcoholic or otherwise, and the few who develop acute pancreatitis, it is hard to see how the former can be a really potent factor in producing the disease.

The presence of a chronic inflammatory condition in the duodenum would no doubt favour bacterial invasion of the duct of Wirsung; but in this connection it is noteworthy that many cases have been recorded in which the exudation in the neighbourhood of the affected pancreas was sterile (*e.g.* Stewart's Case I., *Annals of Surgery*, 1906, p. 723).

3. *Hæmorrhage.*—The association of hæmorrhage into and around the pancreas is in many cases of acute pancreatitis so notable that it has been regarded as a cause of the disease. This matter will be discussed under Pathology.

Pathology.—Under this head may be discussed—(1) The appearances of the pancreas as regards inflammation; (2) hæmorrhage; (3) fat-necrosis; (4) the urine; (5) the cause of death.

1. The pancreas shows different conditions of inflammation according as it is observed early in the course of the disease during laparotomy, or later post mortem. It may be simply enlarged in all or most of its dimensions, with some tenseness of its capsule and œdema of the surrounding cellular tissue: if this condition is

unrelieved, the tension leads to disorganisation of the parenchyma of the organ.

Microscopic examination of the organ in the early inflammatory condition shows some small-celled infiltration and early vacuolisation of the parenchymatous cells. There is a preponderance of evidence against this early inflammatory condition being due to organisms; the advent of the latter is a late event in the course of the disease: "it is agreed by almost all writers on the subject that the bacteria isolated . . . have no etiological connection with the lesion, and are only present through secondary invasion of the injured tissues" (*The Pancreas—its Surgery and Pathology*, Mayo Robson and Cammidge, p. 142).

This is a significant conclusion against the etiological importance of infection from a chronically catarrhal duodenum. The later extreme results of the inflammatory process are the production of necrosis and sometimes gangrene of the pancreas. Case I. is typical of the progressive inflammatory process ending in gangrene. In both the early and late stages of inflammation hæmorrhage may be present and obvious.

Suppuration is not a feature of the disease, as in ordinary inflammatory infections.

Fitz. however, thought there were cases of suppurative pancreatitis which ran a course similar to acute pancreatitis, beginning with equal suddenness but not so rapidly fatal, and more rarely associated with fat-necrosis.

He also collected twenty-two cases of suppurative pancreatitis, which he regarded as cases of acute pancreatitis showing a stage of suppuration. But it is difficult to estimate the value of these cases, most of which were reported many years before acute pancreatitis was recognised clinically and before fat-necrosis was described.

It may be definitely stated that in acute pancreatitis suppuration is not a notable feature, judging from the cases reported since the publication of Fitz's monograph.

2. *Hæmorrhage*.—The occurrence of hæmorrhage into the pancreas and surrounding tissues is well marked in many cases, and has been regarded as of prime importance in producing the disease.

Fitz¹ regarded it as directly causative in certain cases, hence his title, Acute "Hæmorrhagic" Pancreatitis; but in other cases he regarded the hæmorrhage as secondary to the inflammation.

¹ Fitz, *op. cit.*

and his reasons for differentiating between the two classes are not forthcoming.

Mayo Robson regards as (a) *ultra-acute* the cases "in which hemorrhage precedes inflammation, and the bleeding is profuse both inside and outside the gland;" and as (b) *acute* the cases "in which inflammation precedes hemorrhage which is less profuse, and is distributed in patches throughout the gland" (*op. cit.* p. 303).

Here, again, we are left without clear guidance as to the above being a distinction capable of demonstration and proof. The difficulty can only be cleared up when, in cases of acute pancreatitis, the immediate cause of the bleeding is discovered. Bleeding into the pancreas is known to occur from a variety of causes, *e.g.* trauma; heart disease; altered blood conditions, as in the acute infectious diseases; scurvy; atheroma; and in these conditions the hemorrhage is not necessarily associated with acute pancreatitis.

My impression is that the importance of the occurrence of hemorrhage in acute pancreatitis is much exaggerated, probably because when present in the organ examined it is so obvious and easy to recognise. It plays no important part in the symptomatology of the affection, except possibly in aggravating the pain if repeated sudden hemorrhages occur; it may be very small in amount, while the symptoms of pain and shock are intense.

In fact there is nothing in the clinical picture of the disease suggesting that hemorrhage is a potent factor in producing its ultimate clearly-defined aspect, and cases such as I. and III. above occur which are typical of early acute pancreatitis, and in the one hemorrhage may be present and in the other absent or trifling. On various grounds it seems to me that in the light of our present knowledge of the pathology of acute pancreatitis, it would be better to drop the term "hemorrhagic," and further, that in the absence of a definitely established explanation of the cause of the hemorrhage, it is on theoretical grounds and by analogy most probably a result and not a cause of the disease.

3. *Fat-Necrosis*.—This condition is by far the most striking pathological phenomenon of the disease under consideration.

Fat-necrosis was first described by Balser in 1882; and later it was proved by Langerhans that the areas of necrosis were produced by the splitting of fat into fatty acids and glycerine; the latter is absorbed and the former combine with calcium to form soap.

The appearances produced by fat-necrosis are quite characteristic, and were at once recognisable in all the above three cases; in Case I. the condition was present to an extreme degree, so that large masses of material of the consistency of butter were produced in the root of the mesentery. Fat-necrosis has been frequently produced experimentally. It can be brought about by any agency liberating the pancreatic secretion from its natural situation in the gland; and there is at present no clear evidence of its being produced by any other substance than the pancreatic secretion. But there is a probability that the lipase contained in the latter requires the co-operation of trypsin to cause preliminary cell-death before the fat-splitting action of the former is brought into play (Wells, *Chem. Path.*, p. 321).

The splitting of fat is thus a consequence and not a cause of the necrosis. The conditions for producing fat-necrosis are constantly present in acute pancreatitis; and if, in addition, the clinical symptoms of acute pancreatitis are present, then the recognition of fat-necrosis is practically pathognomonic of the disease.

But cases have been recorded (Fawcett, *Lancet*, 1st December 1906, p. 152; Sawyer, *Lancet*, 19th January 1907, p. 158) showing disseminated fat-necrosis without evidence of accompanying pancreatic disease. These cases are hard to explain; but it may well be that the pancreatic secretion is still the causative agent, the morbid affection of the pancreas whereby its secretion is abnormally liberated being in these cases unaccompanied by any recognisable changes in the organ.

It is, I believe, on the lines of investigating the absolute initiation of the process whereby the pancreatic ferments are abnormally liberated, that the elucidation of all the phenomena, pathological and clinical, is to be eventually achieved.

4. *The Urine*.—The chemical reaction present in fat-necrosis resulting in the production of glycerine led Cammidge to make experiments directed to the possibility of detecting free glycerine in the blood from cases of supposed pancreatic disease. This line of investigation was abandoned; but, as a result of continued experiment, Cammidge found that the urine in cases of suspected pancreatic disease gave evidence on analysis of the presence of a "sugar complex, probably a nucleoglycoprotein, which on hydrolysis with hydrochloric acid gives rise to a substance having the reactions of a pentose, and the typical crystals obtained in the reaction are pentosazone crystals."

These crystals obtained by the reaction between the phenylhydrazin and the nucleoglycoproteid are microscopically "long, light yellow, flexible, and hair-like, arranged in sheaves, which when irrigated with 33 per cent. sulphuric acid melt away and disappear in ten to fifteen seconds, after the acid first touches them." Cammidge excluded the possibility of the "pancreatic reaction" depending on metabolic changes due to abolition of the function of the gland by experiments carried out on pancreatectomised dogs; in the latter the reaction was not obtained, even although present previous to pancreatectomy, while the gland was in a condition of acute inflammation artificially produced.

Case II. of the above series is of interest in still exhibiting the pancreatic reaction five years after the original illness.

Cammidge's pancreatic reaction is of value as a diagnostic and of great chemical interest, but its usefulness in cases of acute pancreatitis is somewhat limited, since the chemical investigation required is elaborate and demands a high degree of technique if the results are to be reliable.

At present, however, a positive "pancreatic reaction" in a sample of urine is strong presumptive evidence of the existence of some form of pancreatic disease.

5. *The Cause of Death.*—This is still largely a matter of pure speculation. It may be that in some cases death is produced very early and suddenly by "shock" causing reflex cardiac inhibition: the rapidly-produced circulatory depression amounting to a state of syncope combined with the intense pain (as in Case I.) would make such a mechanism possible.

It is probable that the inflammatory process by producing local tension may cause severe shock reflexly through the solar plexus, the clinical signs being strikingly similar to those produced by a blow on the epigastrium or testicles. But when death is delayed for a few days, the possibility of a toxic condition being responsible is strongly suggested.

Doberauer's experiments (*Ann. Surg.*, 1906, p. 789) led him to believe that death was caused by the absorption of poison produced in the inflamed gland. He produced acute pancreatitis in dogs by ligature and division of the pancreas: and the insertion into other animals of portions of the inflamed pancreas produced in them the same disease. But he found that the effects of ligature and division of the pancreas could be prevented by previous repeated small doses of inflamed pancreas.

As a result of these experiments he concluded that immunity

could thus be established "not to pancreatic substance, but to poison contained in the inflamed organ."

SYMPTOMATOLOGY, DIAGNOSIS, AND TREATMENT.

Symptoms.—Sudden, deep-seated epigastric pain rapidly attaining a sustained degree of quite extraordinary severity is the initial symptom.

The agony is so intense that it is difficult to obtain from the sufferer reliable information as to its character; but if it is referred (as in all three cases above) to the back (lower dorsal region), this is an important diagnostic point, on which, in my opinion, sufficient stress is not laid; the pain may radiate upwards towards the thorax. The pain having rapidly become intense is maintained so continuously; there is no marked remission as in the various forms of colic, although it tends to be paroxysmal. General symptoms of collapse are present almost from the outset, evinced by great circulatory depression, the skin being pale and clammy, and later cyanotic; pupils semi-dilated, pulse difficult to feel, rapid, of very low tension, and eventually altogether absent at the wrist for hours on end (*vide* Case I.).

On inspection of the abdomen there may be limitation of the respiratory movements, but this is not a striking symptom.

On palpation there is an absence of the two cardinal physical signs of peritonitis, viz. rigidity and tenderness; on the contrary, pressure tends to relieve the pain, and was in Case I. constantly applied by the patient himself. Constipation is usually well marked, but flatus can be passed. Vomiting is, in my experience, not a notable feature. Intense thirst and great restlessness may be present; the mental condition is quite clear, and the patient is miserably aware of the desperate nature of his malady. After the first twenty-four hours other physical signs may be developed; there may be localised epigastric swelling and perhaps dulness on percussion, extending into the left hypochondrium. If the patient survive for more than two or three days, the pain tends to become more widely diffused, but is less intense; there is still, however, an absence of the classical signs of general peritonitis.

Examination of the urine, if this can be carried out, may show the "pancreatic reaction," and oxaluria is frequently present.

Diagnosis.—The diagnosis, though difficult, ought to be possible in well-marked cases such as the above. The first essential towards making a diagnosis is to bear in mind the rule laid down by Fitz

more than twenty years ago. "Acute pancreatitis is to be suspected when a previously healthy person, or sufferer from occasional attacks of indigestion, is suddenly seized with violent pain in the epigastrium, followed by vomiting and collapse, and, in the course of twenty-four hours, by a circumscribed epigastric swelling, tympanitic or resistant, with slight rise of temperature." The application of the above rule implies some knowledge of the previous history of the patient—not always possessed by the medical attendant, and hard to elicit from the agonised patient. If, however, the previous history is known, it is of great value as an aid to a differential diagnosis.

In the entire absence of knowledge of the previous history it is extremely difficult to make a positive diagnosis of acute pancreatitis within the first twenty-four hours, the main reason for this being that it is almost impossible to exclude with certainty perforating gastric or duodenal ulcer.

In such circumstances the presence (ascertained as rapidly as possible) of the "pancreatic reaction" is of great value.

But I would suggest that in the later serious gastric or duodenal conditions, which, of course, demand immediate laparotomy, the pain and general constitutional symptoms are much less severe and sustained, and the signs of localised peritonitis (tenderness and rigidity on palpation) are well marked, which I do not believe they are in cases of acute pancreatitis.

If the patient is obviously well nourished, this is against the probability of gastric or duodenal perforation.

When, however, the previous history is known, or can be ascertained, it is of great help in excluding the probability of perforating gastric or duodenal ulcer.

Other affections to be excluded are:—(1) Intestinal obstruction; (2) irritant poisoning; (3) biliary colic and cholecystitis; (4) fulminating appendicitis; (5) tabetic gastric crisis.

1. *Intestinal Obstruction*.—It is rare to find intestinal obstruction with the early symptoms referred clearly to the epigastrium. Vomiting is a conspicuous early symptom in obstruction high up in the gut, and may be quite inconspicuous in acute pancreatitis. Hourly observation of the progress of the disease fails to show the development of complete obstruction to the passage of the contents of the bowel, and general abdominal distension and signs of general peritonitis are not present. Moreover, the severe constitutional symptoms rapidly produced are not observed to anything like the same degree in any form of intestinal obstruction in its early stages.

2. *Irritant poisoning* is to be excluded by the absence of local caustic action and of evidence of poison having been taken accidentally or suicidally.

3. *Biliary Colic and Cholecystitis*.—In biliary colic there will probably be a history of previous attacks; the pain is typical in its character and distribution, and is accompanied by definite remissions, and the general constitutional symptoms are much less severe.

In cholecystitis the distended gall-bladder can usually be felt, and there are signs over it of localised peritonitis.

4. *Fulminating Appendicitis*.—In fulminating appendicitis the pain is at first around the umbilicus and is soon referred to the region of the appendix; there are early the signs of commencing general peritonitis, and often at the beginning a considerable rise of temperature.

5. *Tabetic Gastric Crisis*.—Tabetic gastric crisis can be excluded by failure to find the signs of tabes.

Prognosis.—The majority of cases are fatal within two or three days if not treated surgically, and the mortality under operative treatment is high.

"Of fifty-nine reported cases of operation during the acute stage, twenty-three recovered." Many reported cases of fatal biliary colic and of non-fatal perforating gastric ulcer (without operation) were probably cases of acute pancreatitis.

Treatment.—This is bound to be unsatisfactory so long as the essential nature of the disease and of its remoter effects on the economy is unknown, which it is at present. Palliative treatment directed to the relief of pain is imperative. Morphia, however, is surprisingly inefficacious, probably because the circulation being so profoundly depressed the drug is much too slowly absorbed. Inhalation of chloroform gave some relief in Case III. Stimulants externally and internally are equally disappointing in relieving the symptoms of collapse. No specific medical treatment is at present available.

Under the head of *operative treatment* may be discussed—(a) Indications for operation; (b) rationale of operation when decided upon; (c) actual operative procedures.

(a) It must at once be laid down that if perforating ulcer cannot be excluded—and many surgeons hold that this can never with certainty be done—laparotomy is at once demanded: the possibility of leaving unrelieved such a certainly fatal condition as perforative peritonitis must always be before the surgeon.

If, however, operation is decided upon, having in view the probability of the disease being acute pancreatitis, then one must ask what is—

(b) The *rationale of operation*. The reply of the surgeon frequently is that he must operate on the same lines as for acute appendicitis, *i.e.* to remove a source of infection or its consequences.

But if, as seems well established, acute pancreatitis is in its early stages not a septic disease, operation cannot be justified on such grounds. In the early stages of the disease the sole object of operation should be to relieve the tension inside the capsule of the pancreas, which, if unrelieved, leads to necrosis of the organ in whole or in part, with ultimately fatal results. Cases II. and III. above are instructive surgically.

In Case II. the presumption is that merely opening the abdomen so affected the local pancreatic conditions, by relieving tension, that resolution occurred instead of necrosis.

In Case III., where the operation was carried farther and the actual condition of the pancreas was investigated, the stage of intra-capsular tension was past and necrosis was already established; and it is hard to see how operation could here be of the slightest service—certainly not by evacuating septic material of the presence of which there was no evidence.

In the rarely-occurring late gangrenous condition, as in Case I., operation should include free drainage of what is by then practically a septic lesser peritoneal cavity.

(c) *Actual Operative Procedures*.—As regards an anæsthetic, local anæsthesia has been advocated. Personally, I should always prefer to give a general anæsthetic.

The abdomen is opened by an incision above the umbilicus in the middle line; if acute pancreatitis is present, fat-necrosis will be at once noted.

The condition of the pancreas should be investigated by opening the lesser sac through the gastro-hepatic omentum.

If there are signs of tension within the capsule, this should be relieved by free incision; hæmorrhage may be free, and must be controlled by direct pressure applied by gauze plugs.

The abdomen should then be rapidly closed, a drainage tube being previously passed down to the pancreas. In the later gangrenous cases, where drainage of the lesser sac is required, this can be best attained by using a posterior incision, recommended by Mayo Robson, in the left costo-vertebral angle, which

insures adequate vertical drainage of the large abscess cavity. In addition, the intravenous injection of warm normal saline solution should be employed.

Summary.—*Acute pancreatitis* is a rare disease, and apt to be mistaken for other affections, unless the possibility of its occurrence is kept in mind when dealing with any acute abdominal illness. It is probable, however, that cases occur oftener than the available statistics indicate.

The *etiology* and *pathology* are not as yet fully understood, especially as regards the production of the very grave constitutional effects which tend to be early fatal. In a large proportion of recorded cases gall-stones were present, and may have been of importance in bringing about conditions favourable to the production of the disease; but typical cases may arise without the presence of gall-stones.

Fat-necrosis is the most striking of all the pathological conditions exhibited. Cammidge's "pancreatic reaction" is probably invariably present.

The *symptomatology* in typical cases is very clearly defined: the symptoms, local and general, are marked by an unusual degree of severity.

The *diagnosis* presents difficulty if it is to be made early, chiefly because it is hard to exclude with certainty commencing perforative peritonitis. If exploratory laparotomy is carried out, the presence of fat-necrosis, taken in conjunction with the clinical symptoms and the presence of the "pancreatic reaction," is pathognomonic.

The *prognosis*, in the light of the present available lines of treatment, is bad.

The *treatment* is not yet scientifically based on full knowledge of the etiology and pathology, and is to that extent unsatisfactory. Failing the acquisition of further knowledge of the subject revealing *specific* medical treatment, the best results are probably to be attained by early operation on the lines above indicated.

CLINICAL RECORDS.

CASE OF SARCOMA OF BRAIN TWO YEARS AND FOUR MONTHS AFTER OPERATION.

By JAMES HODSDON, F.R.C.S.,
Surgeon, Royal Infirmary, Edinburgh.

THE patient, J. H., a miner, æt. 27, was admitted to Ward VI. on 12th February 1908, complaining of failing sight, headache, and vomiting.

His illness began about the middle of December 1907 with a sudden attack of giddiness. This was followed on the next day by severe frontal headache. The giddiness and headache had persisted practically every day up to his admission. He noticed his sight was progressively failing, and on several occasions he vomited without feeling nausea, and without relation to food. His sight became so feeble that his doctor sent him to Dr. George Mackay, who reported double optic neuritis, and transferred him to the Medical House. Patient denies syphilis and gonorrhœa.

On admission patient was found to be mentally dull and somewhat restless. He complained of constant severe frontal headache. Sensations and motor power normal. Advanced double optic neuritis. All reflexes slightly exaggerated. No Rombergism. There was some tenderness on tapping over the right frontal region. Other systems normal.

Operation.—On 17th February I made a U-shaped incision over the right frontal region and turned down a flap. A large piece of bone was removed by trephining, the opening enlarged by rongeur forceps, and the dura opened. The brain was found to be bulging and oedematous, and a large tumour was exposed. The tumour was removed, together with some brain substance, the flap replaced, and the wound drained on account of extensive oozing.

The progress of the case was uneventful. Headache eased, vomiting ceased, but sight did not improve. The patient left the Infirmary on 21st March with a large hernia cerebri.

Pathological Report.—Dr. T. Shennan reported "that the tumour was a spindle-celled sarcoma, while all parts showed a special relationship to the blood-vessels. The concentric arrangement of the cells around the vessels is best seen at the periphery of the section where the tumour has been a little opened out. At parts there is a myxomatous change."

The patient was last seen in June 1910. There was no hernia

cerebri, and the scar of the incision was barely perceptible. He can only appreciate light and darkness, has no frontal headache, and reports himself as feeling perfectly well.

Mr. Struthers showed the case for me at the Medico-Chirurgical Society in May.

The patient was referred to me by Dr. Gibson for operation. There were no localising symptoms, and having trephined over the area where some tenderness could be elicited on pressure, I was fortunate in being able to remove the tumour instead of having to perform a decompression operation.

A CASE OF CONGENITAL SCOLIOSIS DUE TO THE INTERPOSITION OF HALF AN EXTRA VERTEBRA ASSOCIATED WITH A THIRTEENTH RIB.

By DAVID M. GREIG, C.M., F.R.C.S.,

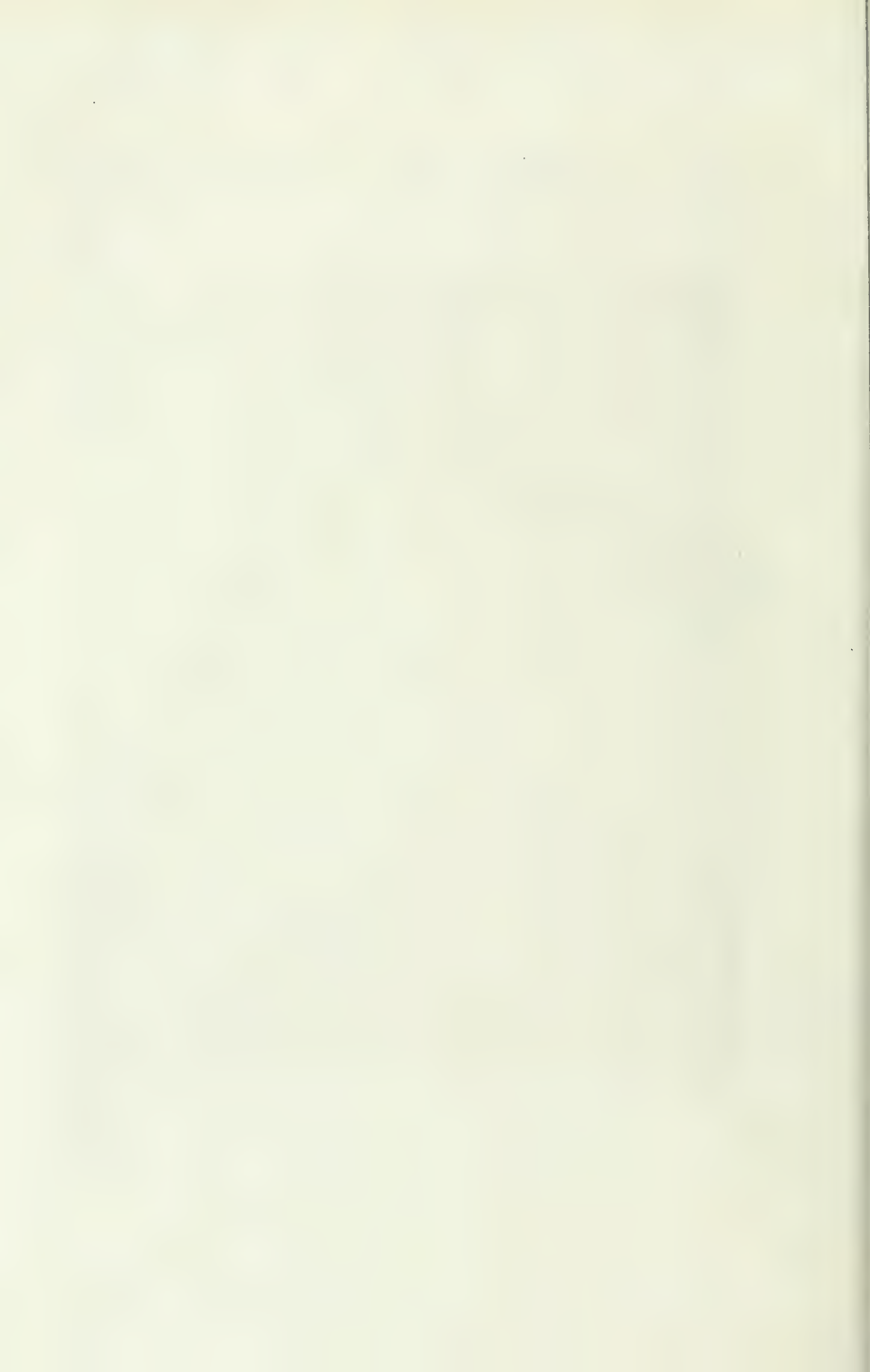
Surgeon, Dundee Royal Infirmary; Lecturer on Clinical Surgery and Surgical Diseases of Children, St. Andrews University.

THE subject of this exceedingly rare deformity is a schoolboy, H. W., aged seven years, referred to me some time ago by Dr. J. S. Y. Rogers. His parents are well and healthy, as also a brother two years older. His birth was uneventful; the mother's confinement normal. She suggests, as the cause of the anomaly in the child, a fall she sustained six weeks before parturition. He was bottle-fed on cow's milk till eleven months old; walked at fourteen months; and in every way, apart from his scoliosis, developed mentally and physically as a normal child. He had measles and whooping-cough at three years, and inflammation of the lungs with the former, but made a perfect recovery. He has grown into a fine boy, and is doing well at school.

The spinal curvature of which he is the subject was noticed at birth, and from time to time his parents have thought that it was growing more or less distinct, but during the four years I have had him under observation there has been practically no difference. He has a marked sinistro-convex dorsal scoliosis, with a corresponding raising of the left shoulder, so that the inferior angle of the left scapula is 2 inches higher than the corresponding angle of the right. This angle, too, seems abnormally prominent, as if the scapula were somewhat tilted from the thorax. There is no difference in size of the scapulae, nor any abnormality about the muscles or their innervation. The spinal curve involves the second to tenth dorsal spines, and at its most marked point is $1\frac{1}{2}$ inch from the perpendicular. The curve is not in any way diminished by his bending forward or hanging by his hands, and it is to be noted that there is no compensatory lumbar curve. There may, however, be a little compensatory cervical



FIG. 1. Showing the primary dorsal curve, and the secondary cervical curves, and the difference in the level of the two scapulae.



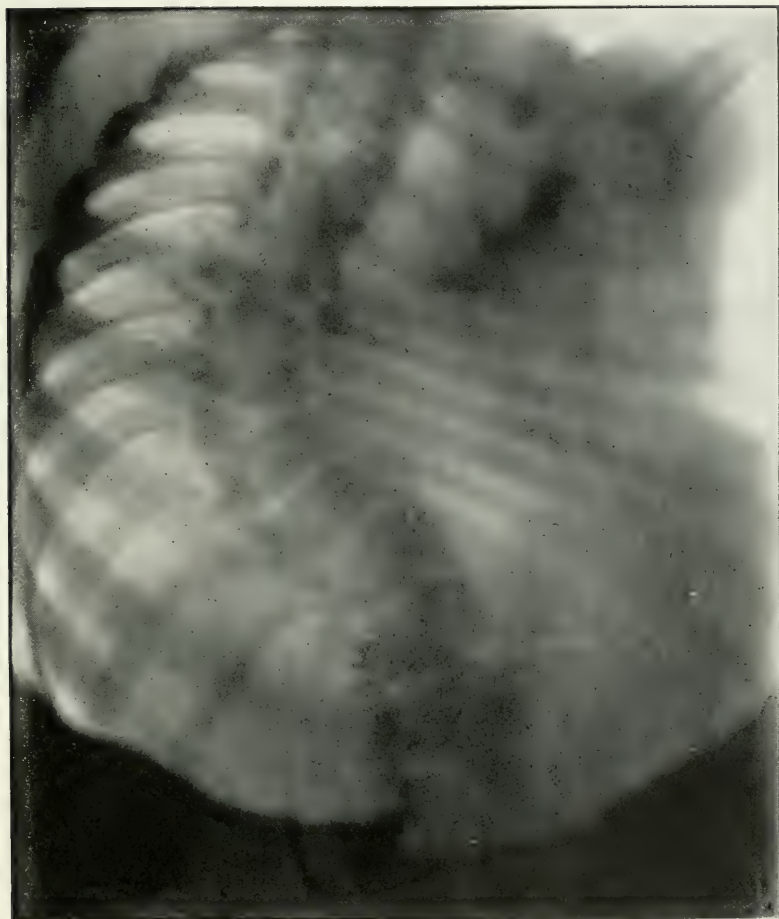
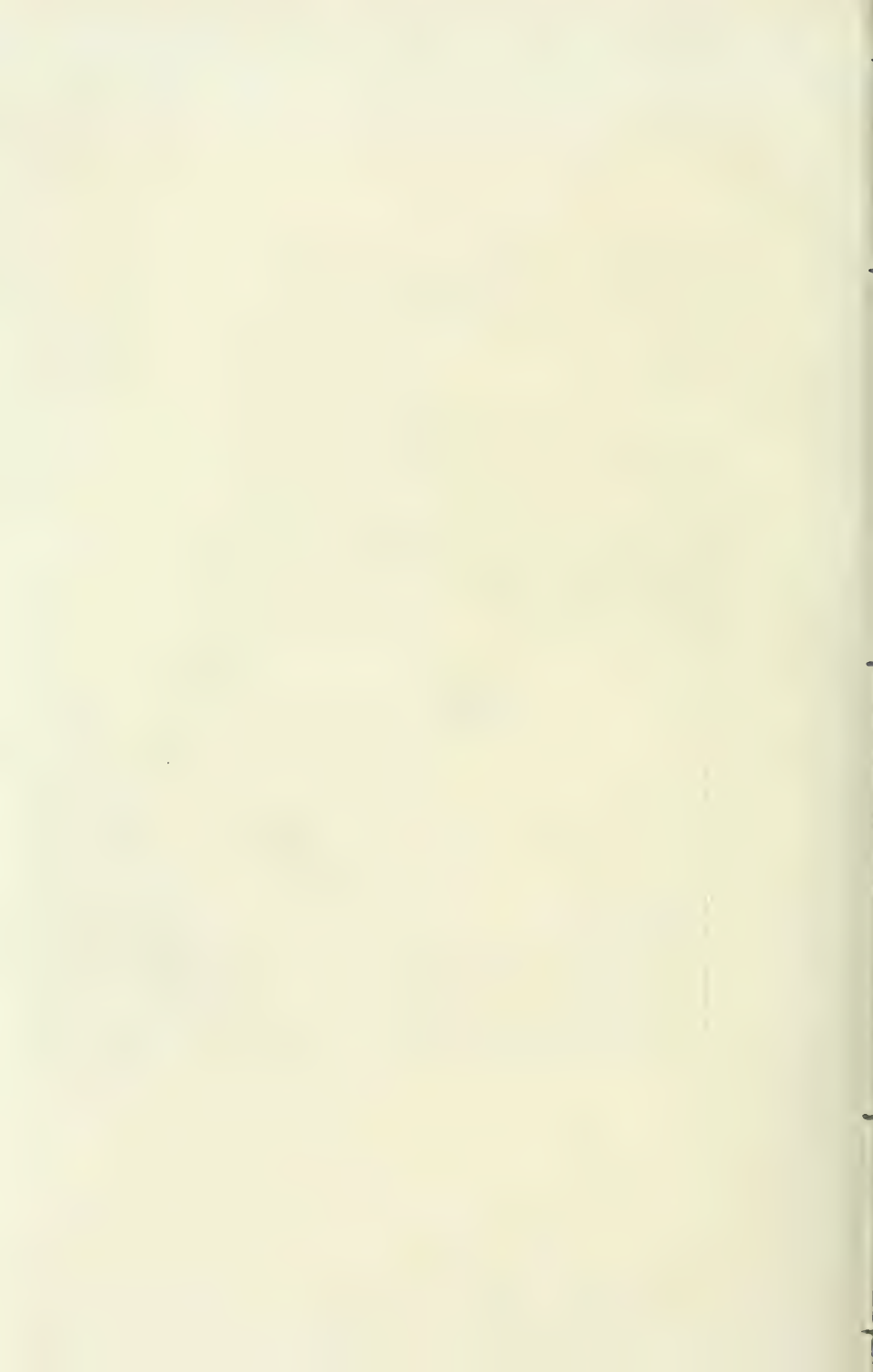


FIG. 2.—Radiogram showing an intercalated half-vertebra between the bodies of the eighth and ninth dorsal vertebrae, with its supernumerary rib attached.



curve, for looked at from behind the upper fibres of the left trapezius seem less developed than the right, and consequently more of the sterno-mastoid is seen from this point of view than is the case on the opposite side, and there appears more of a hollow between the sterno-mastoid and the trapezius. These points are well brought out in the photograph (Fig. 1). All his movements are normal, and he has no other abnormality. A radiogram (Fig. 2) taken for me by Dr. G. A. Pirie shows the interposition of a half vertebra between the bodies of the eighth and ninth dorsal vertebræ on the left side. There are also seen to be on the left side thirteen ribs, and the obvious conclusion is, that along with the extra half vertebra has been developed an additional rib. The radiogram was taken a little obliquely, to show the centra of the vertebræ and the intervertebral discs apart from the shadows cast by the spines and laminae, and consequently the ribs on the right side are somewhat indefinite, but a direct antero-posterior view shows the twelve ribs normal on the right, but of course approximated at the spinal concavity.

Congenital scoliosis in an otherwise healthy child is due to a deficiency or excess of part of one or more vertebræ, and with this a corresponding abnormality in the ribs may exist. Whole vertebræ with their ribs may be wanting, and of such a nature is the case recorded by Willett and Walsham.¹ A rib may be absent without abnormality of the vertebræ, but it is doubtful if it is ever wholly absent; rather is it represented by a short process corresponding to its posterior end. Such abnormalities in the ribs are not infrequently associated with absence or defects in the thoracic wall muscles. On the other hand, a rib may be duplicated without abnormality of vertebræ. But such defects do not produce scoliosis. Cases are on record in which half a vertebra has failed to develop² and this naturally produces a curvature with its concavity to the defective side. In my case there was half a vertebra in excess, interposed between the eighth and ninth dorsal bodies, and along with this an extra rib, apparently well and fully developed. Topinard's³ observation, "When in the human subject there is a thirteenth rib on one side only, or thirteen on both, a lumbar vertebra is the point of articulation," is not quite correct; it would be more correct to say that a lumbar vertebra may assume the character of a dorsal and be associated with a thirteenth rib. The thirteenth rib in my case, however, was undoubtedly not a lumbar rib, for the last ribs on either side were symmetrical in size, shape, and articulation.

An extra vertebra has been noted in each region of the spine—cervical,³ dorsal,² lumbar,⁴ and sacral⁴—but a normal vertebra, though supernumerary, produces no deformity unless, as has indeed been recorded, the body be thicker at one side than at the other, when necessarily a scoliosis is produced. The interposition of a half vertebra

seems to occur only in the lower dorsal or upper lumbar regions and indeed, in my case, the interposition has taken place unusually high in the dorsal series. The most recent contribution to the subject is published by Langmead,⁶ where vertebral interposition occurred in the dorsal region, but was not associated with any extra rib. He states that only on five occasions previously has the abnormality been described during life.

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RECENT LITERATURE.

CRITICAL SUMMARIES AND ABSTRACTS.

MEDICINE.

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NERVOUS DISEASES—INTERMITTENT CLAUDICATION.

Atypical Forms and Complications of Arterio-Sclerotic and Angio-Spastic Dysbasia (Intermittent Limp—Intermittent Claudication).—Curschmann (*Monch. med. Wochenschr.*, 2nd August 1910) describes a series of cases of this malady, in which the misleading character of the symptoms made the diagnosis a matter of some difficulty. The first patient was a man, aged 48, with a syphilitic history, in whom the characteristic symptom of intermittent limp—pain in the legs on exertion—was reversed. He complained of pain in the heels during rest, and on the first examination nothing could be made out to account for it. After eight weeks of fruitless treatment at home and in hospital, it was found by the X-rays that the tibial vessels were sclerosed (showed a double contour in skiagrams). At the same time variations in, and temporary absence of,

pulsation in the vessels of the foot were detected. These signs were not present when he was first examined. The patient's description of his sensations was exactly the opposite of the usual complaint. So long as he lay in bed he had severe pain in the feet, and though the first few steps he made were yet more painful, the pain rapidly disappeared when he went about, and after five or ten minutes he could walk without discomfort for several hours, when he became tired. At rest, the pulse at the ankle was absent or minimal; after he walked about it became much more perceptible. The case, therefore, presents some analogies to that form of arterio-sclerotic angina in which the seizures occur only when the patient is at rest, the explanation being that exertion induces a more forcible heart beat and an improvement in the blood supply of the region served by the sclerosed arteries. The second case was somewhat similar. A man, aged 30, also syphilitic, complained of pain in the feet on rising in the morning. The pain was so severe as to make him hobble about, but passed off after ten minutes or so. It recurred during the day, whenever he first rose to his feet after having been at rest for a time. On examination he had meralgia paræsthetica of the right thigh, the right foot was colder than the left, and the right posterior tibial artery was less easily palpable than the left. In the third patient the symptoms due to arterio-sclerosis were associated with others due to vascular spasm. He was a carpenter, aged 56, giving no history of syphilis or excess in tobacco, but was alcoholic. For six months he had had typical symptoms of intermittent claudication—pain in the legs on walking, incapacitating him from further effort until he rested—and also, after using a plane for half an hour, his hands became stiff, his fingers "dead," and his forearms acutely painful. For five years he had been subject to anginal attacks on exertion—tingling in the fingers, pain in the left side of the chest, and oppression in the region of the heart. On examination he was found to have aortic disease, arterio-sclerosis of the vessels of the limbs, and very defective pulsation in the arteries of the legs. We thus had combined in one case—intermittent claudication, bilateral spasm of the vessels of the hands on exertion (vaso-constrictor acroparæsthesia), and arterio-sclerotic angina pectoris. The following is an analogous case of vaso-constrictor acroparæsthesia, without arterio-sclerosis, but with typical intermittent limp:—A married woman, aged 32, who from time to time suffered from spontaneous pains in the legs, which became "dead," pale, and lost the power of feeling. Sometimes dead fingers went along with this. On walking, symptoms of intermittent claudication. No abnormality of the arteries. Rapid improvement under quinine and galvanism. This case is a pure angio-spastic dysbasia, which Oppenheim, in opposition to Erb, regards as a separate form of the disease. Curschmann has found that in young people without either arterio-sclerosis or arterial spasm there may be permanent failure of the pulse at the ankle, and, subjectively, symptoms of inter-

mittent claudication. On the other hand there are cases, like the preceding, in which arterial spasm, without permanent failure of the pulse, is the sole cause. It may be extremely difficult to distinguish between a purely arterio-sclerotic and a purely arterio-spastic case, desirable as differential diagnosis is from the point of view of prognosis and treatment. A woman, aged 41, had undergone pan-hysterectomy three years previously. No history of syphilis, alcohol, or tobacco. Had complained for three months of typical intermittent limp. Left ankle pulse absent, but the vessel could be felt as a soft, narrow cord. Right pulse normal. No other physical signs. Here there was complete absence of positive signs, and of a cause, of arterio-sclerosis, yet treatment was ineffectual, and the case could not be certainly regarded as a purely spastic one. In the next case described, intermittent claudication (probably angio-spastic) was combined with osteo-malacia. The patient was a married woman, aged 46, twice pregnant at 29 and 30. About two years ago began to develop osteo-malacia (girdle pain, waddling gait, diminishing stature), and about the same time the feet began to get ice cold and powerless after she walked for a quarter of an hour. After a short rest this passed off, to recur on renewal of walking. For past six months unable to walk at all. On examination, evidences of osteo-malacia; can only walk when supported. Both pulses absent from the dorsa of the feet; pulse at ankles normal; no sign of arterio-sclerosis. After two months' rest in bed, and a course of phosphorus, the subjective and objective signs of osteo-malacia disappeared, the pulsation returned to the vessels of the feet, and she could walk for two hours without limping. Curschmann thinks that there was more than a casual relation between the osteo-malacia and the arterial spasm, both on account of the simultaneous improvement of both diseases, and because in three other cases of osteo-malacia he has observed the occurrence of vaso-constrictor attacks in the extremities. Curschmann ends his paper by protesting against the undue extension of the term "intermittent claudication." As he says, it is at present a disease which is comparatively seldom correctly diagnosed by general physicians, and to adopt such a scheme as Grasset's is to withdraw all bounds from a concise and definite symptom-complex. Grasset's classification runs:—1. Intermittent claudication of the psychic functions—amnesia, delirium, &c. 2. Intermittent claudication of the sensory motor nervous system—hemiparesis, Déjerine's spinal form, peripheral form. 3. Sensory claudication—vascular crisis, angina, abdominal crisis. 4. Intermittent claudication of equilibrium, of orientation, &c.

INTRA-UTERINE POLIOMYELITIS.

F. E. Batten (*Brain*, 1910, Part 129) brings forward some evidence that intra-uterine infection with the virus of poliomyelitis may occur. He records two cases, bearing on the question, of which the first is the

more conclusive. The patient was a boy, aged 2 years, who, after a very rapid and easy labour, was born with weakness of the left arm, and as the time came when he should have begun to use his legs, was found also to have paresis of his lower extremities. At 2 years he had a flaccid paralysis of his left deltoid and biceps and weakness of his supinator and triceps. The right leg was wasted, especially below the knee; the left leg was also weak. Sensation intact; diminished or lost faradic excitability in the palsied muscles. The child died of diphtheria at 8 years of age, and on post-mortem examination the most striking features were—(1) diminution in size, not only of the cord, but also of the grey matter in the regions affected; (2) the presence of areas in the ventral horns in which there was an almost complete absence of medullated fibres; (3) the absence of large cells in the ventral horns of the regions of the spinal cord most affected; (4) diminution in size of certain ventral roots; and (5) pallor of the antero-lateral tracts. The condition was exactly similar to that of late cases of anterior poliomyelitis. The objections which might be raised to accepting this as a case of intra-uterine poliomyelitis are—(1) that an acute onset after birth may well have escaped the mother's notice; (2) that the condition was due to hæmorrhage into the spinal canal at birth; (3) that it was a developmental defect; (4) that it was due to extreme and severe injuries to the peripheral nerves at birth, with consecutive atrophy of the cells of the ventral horns. Batten rejects (1) as improbable, and (3) as inconceivable. Hæmorrhage into the spinal canal at birth is not very rare, but one extensive enough to have caused such widespread damage should have left some trace behind it, and of this nothing was found. Injury to nerve roots must have affected the lumbar, as well as the most frequently involved cervical region, and this seems incompatible with so easy a labour. In the second case the child was believed to have congenital dislocation of the hip; in reality, it was a case of anterior poliomyelitis. Direct evidence of the congenital nature of the condition was absent. Batten believes that the first case was one of intra-uterine poliomyelitis, though the chain of evidence is in some respects incomplete. Having regard to the pathological work of Flexner, Lewis, Levaditi, and Landsteiner, as to the infective nature of poliomyelitis, some test other than a clinical one may in the future become applicable to these cases, and it will be possible to say, from an examination of the blood, whether the child has, or has not, had poliomyelitis.

SEROUS MENINGITIS.

Cerebral Tumour Simulated by Serous Ventricular Meningitis.—Raymond (*La Presse Méd.*, 9th March 1910) discusses the rare and puzzling cases in which the symptoms of cerebral tumour exist, but in which the progress of the case disproves the correctness of this diagnosis. He

reports two cases from this point of view. The features of both are not very dissimilar. In both there was the comparatively rapid onset of severe headache, vomiting, loss of sight, and double optic neuritis. Cerebral tumour was diagnosed. In the course of a few months some improvement took place, and ultimately both patients (women) recovered completely, except for partial blindness in one case and total blindness in the other, with, in both, optic atrophy. In one patient ten, in the other fifteen, years have elapsed since the first onset. Looking back on the cases, Raymond does not see what other diagnosis could have been made with the knowledge we then had; now he looks on them as, in all probability, instances of serous ventricular meningitis, described by Quinke as localised chiefly in the intracerebral pia, and opposed to ordinary purulent meningitis, just as serous pleurisy is opposed to purulent pleurisy. Quinke thought that this serous meningitis was not infective, but Hutinel, Netter, and Mya have detected attenuated organisms (pneumococci, streptococci, staphylococci, and *B. typhosus*) in the cerebro-spinal fluid. Clinically, serous meningitis accounts for most cases of acquired hydrocephalus; it is most common in children, and numbers as its principal symptoms—headache, delirium, loss of consciousness, amblyopia, proceeding to amaurosis, optic neuritis, vomiting, bradycardia, and, more rarely, paralysis of the cranial nerves. Three clinical forms occur—(1) acute, with a course of a few weeks, resembling ordinary cerebro-spinal meningitis; (2) chronic, with persistent headache and vertigo, which may last for years and simulate neurasthenia; (3) subacute, lasting for several months and mimicking cerebral tumour. The chief distinguishing features of the last type are the comparatively sudden onset and rapid development of blindness and optic neuritis: the remissions and relapses; and the ultimate recovery. From the practical point of view, the importance of correct diagnosis is the inauguration of proper treatment. As syphilis is a cause in a good many cases, a thorough mercurial course should at once be started. The increased intracerebral pressure should be met by lumbar puncture, or, if that fail in effect by reason of a blocking of the communication between the cranial and spinal cavities, by trephining with a view to decompression.

SURGERY.

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SURGERY OF THE PITUITARY GLAND.

A. E. HALSTEAD reports two cases of tumour of the hypophysis operated on by the oro-nasal method, and at the same time gives a concise summary of the different methods suggested and adopted for the removal of such tumours (*Surgery, Gynecology and Obstetrics*, May 1910). Two routes are possible—the intracranial and the extracranial or trans-sphenoidal. Through the former the gland may be reached either by way of the anterior or the middle cranial fossa, and the greater part of the operation may be extradural, or the dura may be opened early.

Through the anterior fossa various procedures have been suggested, but no successful case has yet been reported. Krause proposed, and carried out on the cadaver, a mode of access by an osteoplastic resection of the frontal bone, working outside the dura to the lesser wing of the sphenoid, then opening the dura and removing the tumour with a specially-curved knife (*Die deutsch. Klin. am Eingange des 19 Jahrhunderts*, Bd. 8). Borchard tried this operation on a living subject, but the operation had to be stopped on account of the excessive hæmorrhage. At a second attempt he successfully removed part of the tumour by Schloffer's method (*Centrab. f. Chir.*, 1908). Kiliani modified Krause's method by opening the dura immediately, ligating the longitudinal sinus, and lifting up the temporal lobe (*Annals of Surgery*, 1904).

Through the middle fossa Horsley is generally credited with performing some operations, opening the dura and raising the temporo-sphenoidal lobe, and Dahlgren is said to have followed this route in one case, but neither has published any records.

Paulesco (*L'Hypophyse du Cerveau*, Paris, 1908) and Cushing (*Johns Hopkins Hospital Bulletin*, May 1910) have employed in dogs a lateral intracranial operation, with a counter-opening to permit of dislocation of the opposite temporal lobe. The same operation has been practised on the cadaver by Silbermark (*Wien. klin. Woch.*, No. 13, 1910), but Cushing believes that, owing to the amount of retraction required, this route is impracticable in human patients, except possibly in benign cysts of the gland that project into the infundibular region. In the cases in which the growth occupies the sella turcica, the trans-sphenoidal route must be selected.

König first suggested the extracranial operation (*Berlin klin. Woch.*, 1900): chisel away the palatal process of the superior maxilla, after separating its muco-periosteal covering; split the

superior maxilla, and retract the two lateral halves; remove the septum, vomer, and other structures of the nose that interfere with the view; open the sphenoidal cells, and chisel away the posterior wall to reach the sella turcica. This operation, and that of gaining access by splitting the nose, as carried out by Löwe (*Zeitschr. f. Augenheilk.*, Bd. 19), resemble the later infranasal operations, but are more severe and disfiguring.

The supranasal route was first suggested by Giordano, and his procedure of turning down an osteoplastic flap of the anterior wall of the frontal sinuses and the nose, going through the ethmoidal and sphenoidal cells, and opening the anterior wall of the sella, has been but slightly modified by all who have chosen this route. In 1907 Schloffer reported a successful case operated on by a similar method (*Beitr. zur klin. Chir.*, Bd. 50). He turned the whole nose downwards and to the right; excised all the turbinate bones, the septum, and the inner wall of the orbit nearly to the optic foramen; removed the inner wall of the left maxillary sinus and part of the nasal process of the left superior maxilla; then broke down the walls of the ethmoidal cells, and so reached the sphenoidal cells and the sella. The tumour projected through the opening in the sphenoid, and was removed by means of a sharp spoon.

V. Eiselsberg has also followed the superior nasal route in six patients, of whom three exhibited symptoms of hypopituitarism (adiposity, sexual abnormalities), two of hyperpituitarism (acromegaly), and one a combination of both (*Annals of Surgery*, July 1910). The pathological condition of the gland was: twice an epithelial carcinoma; twice a sarcoma; once a carcinoma or sarcoma; and once a cyst. Of the individual cases, the group exhibiting the adipose-genital degeneration were cured by the operation; the two in the second group succumbed to meningitis; and the sixth case was considerably improved. The results showed that the prognosis was worst with regard to vision, and on that account the operation should be done early. In all the same type of operation was performed. An incision was made along the junction of the left side of the nose with the cheek, meeting a transverse incision at the level of the root of the nose. The nose was reflected downwards and to the right, the septum divided, and the turbinated bones removed. To give access to the sphenoidal cells, the vomer was divided, and the section was made as far back as possible to prevent saddle-nose. In the later cases of the series, urotropin, as suggested by Cushing, was given beforehand, and Hochenegg's method of packing the nasal cavity was adopted, so that the head did not require to be kept in the hanging position. Further, temporary resection of the frontal sinus was carried out, but, according to Koerber, this is unnecessary. The opening of the sella turcica was made exactly in the middle line, and not too far

forwards, to avoid injury to the carotid arteries and the optic chiasma. After removal of the tumour, drainage was introduced, the nasal cavity packed, and the skin incision closed. Cushing has turned down a similar osteoplastic flap, rongeured away the walls of the ethmoidal cells, and chiselled a narrow channel backwards to the sphenoidal cells.

The infranasal route was suggested by Kanavel (*Journ. Amer. Med. Assoc.*, November 1909): turn up the nose; do not interfere with the ethmoid, but remove the turbinates, deflect the septum, and cut away the vomer. The oro-nasal method, practised by Halstead in two cases, is a modification of this operation (*Surgery, Gynecology and Obstetrics*, May 1910). The first patient was a man of 39, in whom the tumour of the pituitary gland was not diagnosed till the symptoms were advanced—bilateral hemianopsia and optic atrophy; he had had diminished sexual power for a year, and a degree of polyuria. Under ether anaesthesia a high tracheotomy was performed, and a Trendelenburg balloon cannula inserted; the nasal cavities and pharynx were plugged with adrenalin gauze, and then chloroform was administered. The upper lip was raised, and the mucous membrane incised parallel to the alveolar process and five-sixths of an inch from the mucocutaneous junction. The soft tissues were freed and the nose gradually drawn up with retractors, the septum being divided with bone forceps and displaced upwards and laterally. Then the inferior turbinates, vomer, and vertical plate of the ethmoid were removed (the middle turbinates had previously been removed), the anterior wall of the sphenoidal sinus was opened, and a blue-coated pulsating mass protruded into the opening in the sphenoid, and was removed with a dull curette. The cylindrical cavity, 1 by 5 inches, was flushed with saline and packed with iodoform gauze. The septum was sutured in position, the mucous membrane of the mouth replaced and stitched, and the tracheotomy tube removed. The patient left hospital in five weeks, and later was able to resume his work.

In the second case, a woman aged 32, the same method was adopted, and a cyst with gelatinous contents removed. The patient developed a high temperature and a frequent pulse, and died shortly afterwards, probably from a disturbance of the circulatory centre, or absorption of material from the crushed gland.

Mixer has reported a case successfully treated by Kanavel's method (*Annals of Surgery*, July 1910). The patient was 27, but appeared to be no more than 18, and he sought advice for failing eyesight, which had begun three years previously. The hair on the head and face was soft, and none was present on the chest or in the axilla. The examination of the eyes showed bitemporal hemianopsia and well-marked optic atrophy. The X-ray showed an enlargement of the sella turcica. At the operation the posterior

nares were packed, and the U-shaped incision described by Kanavel (*loc. cit.*) was made beneath the nose. The nasal processes were divided with a chisel, and the nose forcibly turned upward and held by a stitch through the septum and forehead at the line of the hair. The mucous membrane was separated from the bony septum, which was cut away. With right-angled retractors a good view could now be obtained of the upper part of the vomer, where it was attached to the sphenoid. This was avulsed, opening the sphenoidal cells. Up to this stage the hæmorrhage was free, but it was readily controlled by adrenalin gauze and the pressure of the retractors. A blunt instrument was thrust through the posterior wall of the sphenoidal cells, and a gush of slightly turbid fluid filled the field of operation. The opening in the cyst was enlarged, its cavity swabbed out and packed with a cigarette wick brought out through the nostril, and the wound closed. A plug of gauze was placed in the other nostril, to keep the septum in position. The recovery from the operation was rapid, though erysipelas developed in the face. According to Mixer, the advantages of Kanavel's operation are: the greater width of the lower part of the nasal opening; good access to the sphenoidal cells by removal of the vomer alone, all other parts, including the turbinated bones, being easily held back with retractors. After the operation, vision improved so much that the patient was able to read without difficulty. The pathological condition of the gland was reported to be a congenital epithelial tumour of the hypophysis cerebri, with cystoid degeneration.

A further account of the magnificent experimental work at present being carried out in the Johns Hopkins Hospital has recently appeared under the names of Crowe, Cushing, and Homans (*Bull. of Johns Hopkins Hosp.*, May 1910). They show, from an analysis of the previous investigations, that opinion varies as to whether or not the pituitary gland is essential to life, and they proceed to settle this point, and to study the physical condition of dogs after partial hypophysectomy. In over 100 experiments they adopted the temporal route, with a counter-opening to procure cerebral dislocation. The operations were carried out with all the elaborate technique adopted for cerebral operations on the human being, and the last 70 or 80 ran an aseptic after-course. In the first cases of the series hæmorrhage was serious, but latterly it was rare. The chief results may be briefly summarised: the removal of the whole of the gland leads inevitably to the death of the animal, with a characteristic train of symptoms. Adults lived only for two or three days, and puppies on an average eleven days, the longest survival after a confirmed total removal being twenty days. The typical after-course is as follows:—The animal quickly recovers from the anæsthetic. If a grown dog, he becomes less lively and responsive on the second or third day. The first

definite symptom is a lowering of the body temperature, and it continues to fall, and before the end drops rapidly, until it may approximate to that of the room. There is a certain stiffness of movement, especially of the hind legs, and a peculiar arching of the back is frequently shown. The blood-pressure falls; the pulse becomes feeble, irregular, and unusually slow; and the respirations may be only three or four to the minute. The urinary secretion is diminished or absent, and a transient glycosuria may appear, especially in the early stages after operation. Rhythmic, spasmodic twitchings of the body muscles are characteristic, and they may be elicited by the slightest external stimulus. Finally, deep coma ensues, and the transition from this stage to death is almost imperceptible.

The same symptoms occur after the same intervals if the pars-anterior alone is removed. Removal of the posterior lobe does not appear to give any characteristic symptoms. After partial removal of the anterior lobe the definite signs of hypopituitarism occur. These are a state of adiposity and a hypoplasia of the organs of generation in adult dogs, or a persistence of sexual infantilism in puppies. Polyuria, glycosuria, tendency to a subnormal temperature, and psychic disturbances are also more or less frequently present. The resistance to infection or other disease is lowered. By glandular transplantation, or by injections of emulsions of the anterior lobe, life may be prolonged after total removal, and the period of threatened cachexia may be successfully tided over in animals retaining fragments of the anterior lobe which are temporarily insufficient.

OBSTETRICS AND GYNÆCOLOGY.

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HYPERTRICHOSIS IN PREGNANCY.

C. F. JELLINGHAUS (*Zentralb. f. Gynäk.*, xxxiv., 2nd April 1910) describes a case of transitory hypertrichosis (excessive hairiness) caused apparently by pregnancy. He points out that skin changes (*e.g.* deposition of pigment and dermatographism) have been commonly referred to in connection with the pregnant state, but that almost no notice has been taken of changes in the hair. Halban, in 1906, directed attention to an increased growth of the body hair, and especially of the lanugo, setting in soon after the beginning of pregnancy, and affecting chiefly the face and the abdominal wall. It was not, as a rule, so marked as to be noticed by the patient herself, and even the medical attendant, if he did not make a close examination

early in pregnancy, might overlook it. Halban went so far as to regard this change in the hair as a probable sign of pregnancy. At the end of the involution-period (after labour) the skin took on again its normal hair covering. In a further research Halban made confirmatory experiments upon animals. He shaved the abdominal wall in the case of pregnant and non-pregnant rabbits, and found that in the case of the latter the abdomen remained hairless from one to two weeks, whilst in the case of the former the skin showed a thick crop of hair within four or five days. Further, if the skin was shaved in the puerperium, the hair grew again quicker than in the case of the rabbits who had not given birth to young ones. Jellinghaus then describes a case in the human subject in which there was not only an increase in the length of the hair in pregnancy, but actually the appearance of hair in unusual places. The woman was an Italian, a brunette, 21 years of age, and married. She began to menstruate at 13 years, and had been regular. She had always been healthy, her pelvis was normal, she had no tendency to the growth of a beard, and showed no dental defects. Her first pregnancy and labour had been normal, and unattended by hypertrichosis; but now in her second gestation, from about the fourth month, an abnormal hairiness on face and abdomen was apparent. She had a dead-born child prematurely at the seventh month, and was admitted to hospital (New York Lying-in Hospital) for infection of the umbilicus. It was found that the lanugo hair on the cheeks and chin was from 1.25 to 2 cms. long, whilst that on the upper lip was shorter; that hair was softer and lighter in colour than that of the head. On the shoulders and chest there was no abnormal growth of hair, but the hairs on the arms and legs were longer than usual. From the symphysis pubis to above the umbilicus the skin of the abdomen carried hairs from 2.5 to 3.5 cms. long, especially in the neighbourhood of the linea nigra. The growth persisted for $3\frac{1}{2}$ weeks after labour and then ceased; that on the face had in part fallen off six weeks after the confinement. There was never any erythema or itching of the skin. Jellinghaus saw the woman six months post partum; he found the hair somewhat shorter, and noticed that the long hairs on the face had been replaced by lanugo; she had had two menstrual periods. The changes in the hair-growth may perhaps be due directly to changes in the ovary, and indirectly to the hyperæmia of the skin which occurs in pregnancy. The observations are interesting, and it is possible that the phenomenon may have some diagnostic importance in obscure cases of early pregnancy.

FORCEPS IN BREECH CASES.

G. Vincenzoni, working in Professor Fieschi's Clinique (*Annali di Ostetricia e Ginecologia*, ann. xxxii. vol. i. p. 101, 1910), reports a case

of breech presentation in which the forceps were used with success, and discusses the question of the advisability of this form of interference under such circumstances. The patient was a vii-para, 45 years of age, at the full term. Labour had been going on for twenty-four hours, and the waters had come away about three hours after the commencement of labour. Uterine contractions were strong and frequent, and yet the presenting part did not descend; the patient was getting exhausted, and the foetal heart was frequent and irregular. The pelvis appeared to be normal. The cervix was fully dilated, and the foetus lay in an incomplete podalic presentation, in the sacroextra anterior position, impacted in the upper part of the cavity of the mother's pelvis. Strong contractions occurred, but had no effect, and the foetal heart continued to beat irregularly, so Vincenzoni decided to interfere. He tried first traction with the fingers in the groins, but could not move the breech by this means. Instrumental interference was now necessary, and the fillet was put on one side as difficult of application in this case, whilst the blunt hook was regarded as dangerous to the foetus. Without much difficulty the forceps was applied, grasping the breech in its bitrochanteric diameter and in the right oblique diameter of the maternal pelvis; with no great force the breech was drawn down to the perineum, and then the forceps was taken off and the foetus delivered manually. It was a very large male child, and deeply asphyxiated, but it was resuscitated. No lesions were produced in mother or child, and the third stage and puerperium were normal. The writer is of opinion that the forceps operation is too seldom had recourse to in cases such as the above, and that the forceps is in many instances "the anchor of salvation" for the foetus, which very frequently runs serious risks in podalic presentations. There is no need for special forms of forceps, but the instrument must be used solely as a tractor, and should be taken off as soon as the nates reach the perineal floor, provided the exploring finger can reach the posterior groin; then, with digital traction on both groins, the breech is born. It is necessary to carry the blades above the iliac crests in the sacro-anterior positions, to place them in the angular space between the thighs and the pelvis in the sacro-posterior positions, not to squeeze the handles together too firmly (in fact, it will be well in most cases to put a folded cloth between), and to make, during traction, some pressure on the fundus uteri in order to prevent the forceps slipping. The application should be made in the oblique diameter, which in most cases corresponds to the bitrochanteric of the foetus.

THE SERUM-DIAGNOSIS OF PREGNANCY.

Fieux and Mauriac (*Ann. de Gynécologie et d'Obstétrique*, 2 s., vii. pp. 65-75, 1910) have carried out a series of experiments, and reached

results which would appear to bring the serum-diagnosis of early pregnancy within our reach. They started with the assumption that in the first months of pregnancy there exists a toxæmia of villous origin, a syncytial intoxication arising from the villous covering of the ovum. The writers employed villous masses coming from a living ovum of two months, extracted from the uterus for uncontrollable vomiting, as well as pieces of a fresh placenta of the fourth month. By desiccation *in vacuo* with sulphuric acid a dry matter was obtained, and this, after being pulverised, was put to macerate in the saline serum (8 per 1000); twenty-four hours later a yellowish liquid was obtained, which contained the antigen (antigen A). Another antigen (antigen B) was got from the fourth-month placenta. In three series of experiments (on patients) the reaction was always found to be much more distinct with antigen A; and the blood serum so got provoked with antigen B, a scarcely sensible hæmolysis, which, with the extract of the villi of two months, became clearly the complement. It should be added that antigen B never provoked a positive reaction, even with the serum of women pregnant at the fourth month. Another set of experiments, in which the antigen was got from the villi of an ovum of six weeks, and from those of another ovum of about the same age, removed on account of vomiting, gave much the same results. The authors, therefore, concluded that the antigen of choice must be got from the villi of a living ovum of from six to ten weeks age; in other words, it is probable that it is in the ovum of from a few weeks up to three months that the antigen or specific toxic element is particularly to be found. Fifty-five observations on the blood of pregnant and non-pregnant women were made. Five pregnancies of from twenty days up to four or five weeks gave negative results; eight pregnancies of two to three months gave positive results; seven pregnancies of from three to four months gave one positive result, two doubtful, and four negative; fourteen pregnancies of from four to nine months all gave negative results; the blood from ten non-pregnant women gave negative results in all the ten; and ten cases of abortion gave positive results in three instances (abortions of from two to three months) and negative results in the remaining seven (abortions of four to five months). The apparent conclusion, therefore, is that the blood of pregnant women contains at certain times in pregnancy a special substance which, in the presence of young villi, deviates the complement. This is simply an application of the general law according to which the introduction of a foreign element into an organism provokes the appearance of an antagonistic element. Here the antigen is represented by the ovum, or rather by its villi, and it is the corresponding antibody which causes the reaction described by Fieuz and Mauriac. It is difficult to be sure about the nature of the antibody; but its presence coincides with the

period when the chorioepithelial elements show the maximum degree of destructive activity. Against this activity the antibody may be supposed to defend the organism, or it may be regarded as a pseudo-antibody consisting of the residue of the maternal tissues destroyed by the villi for their fixation. Perhaps there is some connection between the life of the corpus luteum in the ovary and the presence in the blood of the pregnant woman of the antivillous antibody. The authors summarise their conclusions thus: The blood of the woman at the beginning of pregnancy contains a specific antibody of the toxic or destructive element proper to the young chorionic villus. This antibody is revealed with great clearness during the course of the second and third months; it lessens very quickly at the fourth month, and is not discoverable in the later months; and it is sometimes found in certain women after an early and recent abortion. Finally, in the case of the pregnant women, a true villo-toxæmia appears to exist in the early months, and this makes possible a serum-diagnosis of pregnancy capable of being applied from the second to the third month of gestation.

OPERATION IN ECTOPIC PREGNANCY.

Elis Essen-Möller (*L'Obstétrique*, N. S., iii. pp. 167-174, 1910) strongly opposes the opinion expressed by Treub, that an ectopic gestation should be operated on only in exceptional cases, and adduces his own statistics, according to which forty-seven out of forty-eight cases were operated upon with no maternal death. Among the forty-eight cases there were four in which the sac had not ruptured, fifteen in which it had ruptured and the hæmorrhage continued, and twenty-seven in which it had ruptured and formed an encysted hæmatocele. Essen-Möller's reasons for operating at once in ectopic pregnancy are as follows:—Negative treatment does not suffice in the great majority of cases; it is often dangerous by exposing the patient to a hæmorrhage which may be fatal; it brings with it the necessity of operating later for complications which may be serious, and under less favourable circumstances; it necessitates a long convalescence, during which rest in bed is essential; and the statistics which seem to show the advantages of expectant treatment are not sufficient from the scientific standpoint, for they doubtless include cases which were not instances of extrauterine pregnancy at all. On the other hand, immediate operation has no greater risks than any abdominal operation; it may not save all the patients, but it may, without doubt, save most, and especially these who, without operation, would immediately succumb to hæmorrhage or some other complication of the disease. Essen-Möller is a confirmed partisan of the immediate operation in cases of ectopic gestation, and for the above reasons. [It will be noted that Hunter Robb, in the *Cleveland Medical Journal* for July 1909, and

several other operators of experience do not agree with Essen-Möller's conclusions.]

INTRAMURAL ABSCESS OF THE PUERPERAL UTERUS.

John A. Sampson contributes a paper on the rarely described condition known as intramural abscess of the uterus in the puerperium (*Amer. Journ. Obstet.*, lxi. pp. 385-403, 1910). After reviewing the literature of the subject, which is very meagre, he narrates four cases (one of which ended fatally) in which operative treatment was employed. He is of opinion that there are distinct groups of cases: first, those in which the uterine abscess or abscesses are the only results of the puerperal infection, or at least the most important results of it; and second, those in which the uterine condition is secondary in pathological importance to others which may result from puerperal infection. He believes that abscess in the uterine wall is much less rare than the small number of reported instances would seem to show. Its cause is puerperal infection, and the abscesses in their number, size, and distribution may be conveniently compared to uterine fibroid tumours, viz. they may be single or multiple, corporeal or cervical (but more frequently corporeal), and submucous, interstitial, or subserous in position. Apparently these abscesses have a tendency to be situated near the uterine cornua. There is a history of puerperal infection after labour or abortion; this becomes chronic, and is followed by slight or by severe symptoms of pelvic inflammation. The uterus feels like a myomatous organ, but the swellings due to the abscesses are not so hard or so well defined. Diagnosis is not always possible, and it must be by exclusion. If no operation is performed, rupture of the abscess in various directions, *e.g.* into the uterine cavity, the intestines, the bladder, the vagina, or into the peritoneal cavity (then usually with a fatal result); or it may extend into the surrounding tissues and become a parametric abscess. Possibly the pus may become sterile and be slowly absorbed. Sampson thinks that while some of the cases may recover spontaneously, there are others in which surgical interference should be undertaken. It should be postponed till the acute symptoms have subsided, and manipulations, douches, and even ergot should be used as little as possible, on account of the risk of breaking down natural barriers and facilitating the extension of the infection. After the acute stage is over no interference should be undertaken so long as improvement continues, but when it ceases, and the patient begins to lose ground, then an operation is indicated. An exploratory laparotomy is to be performed; if a single uterine abscess is found, it may be opened and drained, but if there are several, hysterectomy should be done (as in one of Sampson's cases). Trans-peritoneal drainage is required when the abscesses are incised.

PATHOLOGY.

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IMPROVED METHODS OF DEMONSTRATING THE TUBERCLE BACILLUS
IN SPUTUM AND OTHER DISCHARGES, AND IN TISSUES.

OF late many improvements have been introduced in the methods of demonstrating the tubercle bacillus. Up to a very recent date, if a sputum was apparently free from that bacillus, when examined under the microscope, after staining films by Ziehl-Neelsen's method, the only laboratory procedure left for completing the diagnosis was inoculation of a guinea-pig with the suspected material. Now, however, as a result of many improvements in the microscopic diagnosis of sputum, &c., a much higher percentage of positive results is obtainable than was formerly possible.

The improvements referred to are either in the direction of *Concentration* of the bacilli, or of new *Staining Methods*.

A. CONCENTRATION METHODS.

These are directed towards the removal or liquefaction of the material suspending the bacilli, or of the tissues enclosing them.

Ellermann and Erlandsen (*Zeitschr. f. Hyg. u. Inf.*, 1908, Bd. lxi. S. 219) give an account of the methods in vogue up to 1908, and the following details are taken from their paper :—

1. *Alkali Methods.*

Biedert (1886) added to 15 c.cm. of sputum 39 c.cm. of cold water and 8 to 15 drops of soda lye. The mixture was boiled; 60 to 90 c.cm. of water added, and the whole allowed to sediment in a Y-shaped glass. The sediment was examined by the customary staining methods. This procedure was modified by Mühlhäuser (1891), and by Czaplewsky (1900), the former using weaker solutions of the alkali, the latter neutralising it with acetic acid directly after boiling, so as to avoid the solvent action of the alkali upon the tubercle bacillus.

Nebel (1903) mixed 8 to 10 parts of lime water with 1 part of sputum, shook vigorously, centrifuged, and, disregarding the sediment, passed the supernatant fluid through a Berkefeld filter. Films were made from the material remaining upon the filter-candle. Petersen, in addition to using lime water, added sufficient caustic potash to make a $1\frac{1}{2}$ to 3 per cent. solution. After standing several hours this was diluted with water and centrifuged.

2. *Ferment Methods.*

Spengler (1895) mixed equal parts of sputum and lukewarm water containing some soda and 0.1 to 1.0 gm. of pancreatin, digested for two to three hours at 37 C., then added 0.1 to 1.0 gm. phenol crystals, and allowed to sediment. The sediment was mixed with water and again centrifuged. Jousset employed a similar procedure, using pepsin instead of pancreatin. Philip (1886) incubated the sputum at 37 C. After twenty-four hours a purulent sediment forms which contains a large percentage of the tubercle bacilli.

3. *Methods Directed Towards the Solution of the Mucus
Suspending the Bacilli.*

Strörschein (1892) shook up the sputum with a solution of borax and boric acid. Ketel (1892) used carbolic acid solution for a similar purpose. Sorgo (1903) added 5 to 7 parts of distilled water to the sputum, shook vigorously, then added 5 to 12 per cent. hydrogen peroxide.

4. *Employment of Heat.*

Dahmen (1891) warmed the sputum for fifteen minutes in boiling water or in a steam bath. After cooling, he sedimented. Hempel (1902) found that four to eight minutes' exposure to a temperature of 65 to 75 C. broke up the mucus, and thus a thin fluid was obtained which could be easily centrifuged. Another method he employed was to heat with weak HCl, and then add Brücke's reagent, which assists in producing a good sediment in which the bacilli can be demonstrated with considerable ease.

Of the above methods the best are Hempel's, and Mühlhäuser's and Czaplowsky's modifications of Biedert's method.

5. *Additional more Recent Methods.*

Ellermann and Erlandsen (*loc. cit.*) introduced a *double method* of preparing material such as sputum. After rendering it homogeneous by digesting it with half its volume of 0.6 per cent. sodium carbonate for twenty-four hours at 37° C., they centrifuged and dissolve the deposit obtained in four volumes of 0.25 per cent. soda lye with heat, and again centrifuged. In the sediment, stained after Ziehl-Neelsen's method, they demonstrated tubercle bacilli in greater numbers than were obtained by any of the older methods above-mentioned. Bierotte (*Berl. klin. Woch.*, 1910, No. 19, S. 877) confirms their results, but concludes that the method, while admittedly a great improvement on older methods, is inferior to a still later method, that of Uhlenhuth (*vide post*). A useful suggestion made by Bierotte is to add a drop of a broth culture of a staphylococcus to the deposit in making the film, so that this is more readily found under the microscope.

6. The "Antiformin"¹ Method.

In the course of an investigation of the action of *antiformin* as a disinfectant, Uhlenhuth (*Cent. f. Bakt.*, Abt. I., Jena, 1908, xlii. Beil. 62-69) found that this substance, added to various fluids and discharges containing bacteria in a concentration of 15 to 20 per cent., quickly caused solution and destruction of all the formed elements, both tissues and bacteria, with the remarkable exception of tubercle bacilli and other acid-fast bacteria. He also found that spores were resistant to the action of this medium. The details of the method are as follows:—

Take 20 to 30 c.cm. sputum, add 15 c.cm. antiformin, and make up to 100 c.cm. with sterile distilled water. The mixture is best placed in a sterile beaker or Petri's dish, standing upon a black surface. After two to five hours, the time varying with the consistence of the sputum, the most minute particles are picked out, or the fluid is centrifugalised, and the flocculent sediment washed thoroughly with sterilised normal salt solution.

Tubercle bacilli tended to gather themselves in clumps, and not only did they not lose their vitality, but they preserved perfectly their vegetative power, as was shown by the ease with which pure cultures of the tubercle bacillus were obtained upon the suitable media, even from putrid tuberculous material, after treatment with antiformin. He believed that this method would turn out to be important in ordinary practice, and so it has proved. A large number of papers have been written, completely confirming his results, and I may refer to two of the more recent of these.

Finkelstein (*Berl. klin. Woch.*, 1910, No. 23, S. 1039) examined the deposit from the treated material (pus, sputum, lymph-glands, liver, lung) obtained by centrifuging it at a high speed and thereafter washing twice or thrice with physiological salt solution. He stained the films by Ziehl-Neelsen's method and its modifications, and also by Gasis's and Much's methods. He found that in 49 sputa in which by the ordinary method from 1 to 10 bacilli were found in a field of the microscope, after treatment by Uhlenhuth's method the concentration of the bacilli was so much increased that from 2 to 100 bacilli were found in a field of the microscope. In 28 sputa in which, when stained by older methods, several fields of the microscope had to be searched before a single organism could be discovered, he found, after homogenisation, that the numbers were increased eight to ten times. In sputa from patients who had so far recovered that no bacilli were to be found in the sputa by ordinary methods, by the antiformin method he detected them in 22 out of 52 cases. Finkelstein concludes that Uhlenhuth's method, on account of its simplicity,

¹ "Antiformin" is a mixture of Eau de Javelle and caustic soda.

easy application, and the delicate nature of the test, is to be highly recommended for ordinary diagnostic work.

Hoffman (*Deut. med. Woch.*, 1910, No. 28, S. 1309) has employed Uhlenhuth's method in demonstrating the presence of tubercle bacilli in pieces of tissue. These tissues were taken from experimental tuberculous animals, and he examined about fifty specimens in all. A piece about the size of a linseed, or even larger, was torn off with forceps, crushed upon the slide, and allowed to dry. 15 to 20 per cent. antiformin solution was then applied, and the slide placed in the incubator at 37° C. until next day. Several drops of water were then carefully added to dissolve up crystals of the salts, and poured off again. Then he stained in the ordinary way, and found it comparatively easy to detect tubercle bacilli. In comparative examinations, without the employment of antiformin, he either failed altogether to find bacilli, or only found single bacilli after a long search.

7. The Ligroin Method.

Lange and Nitsche (*Deut. med. Woch.*, 1909, No. 10, S. 435) discovered that on shaking a mixture of tubercle bacilli and non-acid-fast bacteria with certain of the hydrocarbons, the tubercle bacilli separated in balls and clumps of the hydrocarbons. They tested for this purpose petroleum-ether, xylol, benzin, ligroin, toluol, benzol, &c. Hydrocarbons with a high boiling point were found to be less suitable than those of lower boiling point—*e.g.* from 90° C. to 120° C.—because the former interfered with the fixation of the film to the slide. Hence they decided to use ligroin as the most suitable medium for the purpose. The method is as follows:—

To 5 c.cm. of sputum add 50 c.cm. $\frac{1}{2}$ normal KOH. Leave at room temperature till completely homogeneous. If placed in the incubator a shorter time is required. Shake frequently. Add 50 c.cm. tap water, and shake up. Add 2 c.cm. ligroin, and shake vigorously until a thick emulsion is obtained. Heat in a water bath at 60° C. until the hydrocarbon has completely separated. Between the two liquids there is now a layer which contains most of the tubercle bacilli, if present. Take as many loopfuls as desired from this layer and place upon a warmed slide. Fix and stain by the usual methods. Egg albumen may be added to the deposit to fix it to the slide.

Lange, Haserodt, and Bernhardt (ref. Finkelstein) improved this method by substituting Uhlenhuth's antiformin for the normal soda solution, and found that still better results were obtained, but not quite so good as by Uhlenhuth's method alone.

Van Scheven (*Deut. med. Woch.*, 1909, p. 1617) employed the antiformin-ligroin method, and, following Haserodt, drove off the ligroin in a water bath at 60° C. The layer of bacilli was then taken up and placed upon a warm slide. Out of 158 sputa in which no bacilli

were discovered by ordinary methods, 15 were found by this method to be tuberculous.

Rau, Srinivasa (*Cent. f. Bakt.*, Abt. I. Ref. 1910, Bd. xlv. S. 409) examined 67 sputa comparatively, with (*a*) the ordinary method, with (*b*) the antiformin method, with (*c*) the ligroin method, and with (*d*) the combined antiformin and ligroin method, and came to the conclusion that the second of these was decidedly the best.

8. Concentration by the Use of Electricity.

Russ (*Lancet*, London, 1909, ii. p. 2) considered that if pathogenic bacteria are susceptible to electric currents traversing the fluids in which they are present, and such susceptibility be shown by movement to one electrode, then the electric current might be used for their direction to that electrode, placed in a pathological fluid for this purpose, the electrode withdrawn, and the organisms identified. He conducted a large number of experiments to determine which electrode attracted tubercle bacilli, and also what was the most suitable electrolyte. He found that these bacilli congregated at the kathode, and that the most suitable electrolyte—for example, in testing for the presence of tubercle bacilli in urine—was a mixture of bromine (2), ethylamine (1), lactic acid (4), and urine (1 or 2 parts).

A current of 15 volts and 2 to 3 milliampères was passed for eight to eighteen hours. The results were very encouraging. His investigations are not yet completed.

B. NEWER STAINING METHODS.

Up to the present time the methods most employed for the demonstration of the tubercle bacillus have been (1) Ziehl-Neelsen's method of staining with carbol-fuchsin with the aid of heat, decolorisation by 20 to 25 per cent. aqueous solution of sulphuric or nitric acid, and counter-staining with an aqueous solution of methylene blue; (2) Gabbet's modification of Ziehl-Neelsen's method, in which the acid and the methylene blue solution are combined; and (3) its modification by Weichselbaum, in which the stained film is decolourised with alcohol as well as with the acid, so that both the "*acid-fastness*" and the "*alcohol-fastness*" of the organism are tested. The last modification is the one in common use at the present time. Recently, Gasís has introduced a method which depends upon the *alkali-fastness* of the true tubercle bacillus, the other tubercle-like bacilli invariably losing their stain when treated with an alkali, though they are always "*acid-fast*" and often "*alcohol-fast*."

Gasís' Method (*Berl. klin. Woch.*, 1909, xlv. No. 18, S. 836; *Cent. f. Bakt.*, O. 1909, S. 111).—The films are made and fixed in the ordinary way, and stained in a mixture of eosin and mercuric chloride solution which has previously been well shaken up. The slide is slightly warmed,

and the stain is allowed to act for about one minute. Then it is carefully decolourised with an alkali until the pale red colour becomes a dirty green and the red colour is no more to be marked. Then for several seconds it is washed in 90 per cent. alcohol, and at once rinsed in distilled water. As a counter-stain, an aqueous solution of methylene blue is used for a few seconds. After washing, the preparation is dried over the flame. The tubercle bacilli appear red on a blue ground, the appearance being similar to that of an ordinary Ziehl-Neelsen preparation. The stains keep for a week.

Finkelstein (*loc. cit.*) tested 8 cultures of the tubercle bacillus, 11 cultures of acid-fast bacteria, 26 specimens of tuberculous sputum, and 12 urines containing smegma bacilli, and confirmed Gasis' conclusions in every respect.

The staining method which is exciting the greatest amount of interest at the moment is that introduced by Much, from the fact that it is claimed to be applicable in those cases in which the Ziehl-Neelsen method fails to disclose tubercle bacilli, and in which the bacilli are present in a granular form only. Much, for example, was enabled to demonstrate the presence of granulated tubercle bacilli, which are not stainable by Ziehl-Neelsen's method, in all cases of caseous infiltration of lymphatic glands. In two cases he states that the virulence of the bacilli was tested, and they were found to belong to the bovine type. He is of opinion that the acid-fast envelope is possessed by the human type, but that virulent bovine bacilli not infrequently divest themselves of this characteristic. Weiss also (*Munch. med. Woch.*, 1909, No. 9, S. 443) is inclined to regard the bacilli which stain by Much's method, and not by Ziehl-Neelsen's, as bovine bacilli.

Much's method of staining (*Berl. klin. Woch.*, 1908, xlv. S. 691; *Munch. med. Woch.*, 1908, lv. S. 1103) consists in treating the specimens for two days at room temperature in a carefully filtered solution of carbol-methyl-violet (or gentian-violet); treatment with Lugol's iodine solution for ten to fifteen minutes; washing in 5 per cent. nitric acid for one minute, and in 3 per cent. hydrochloric acid for ten seconds; decolourising in equal parts of acetone and alcohol until no more colour comes off, controlling the action under the microscope; drying with filter-paper, and counter-staining with 1 per cent. safranin solution for from five to ten seconds. The specimen is then washed in water, dried with filter-paper and over the flame under the oil immersion. The preparations thus obtained are not permanent, but if they fade they can be restained, as often as is required, without damaging the film.

The granulated rodlets or free granules may be difficult to find, and for this reason much patience has to be exercised in looking through the specimens. The granules frequently lie at different

levels; they are quite round, possess sharp contours, and stain deeply. They vary in size, but are always smaller than the smallest cocci, and may resemble dust particles.

Lier, Wilhelm (*Cent. f. Bakt.*, 1909, Abt. I. Bd. li. H. 6, p. 678) and many others have confirmed Much's results, and claimed that better results are got by this method than by Ziehl's method, particularly (Lier) in sections of tuberculous skin affections.

Berger (*Cent. f. Bakt.*, 1910, Abt. I. Orig. Bd. liii. H. 2, p. 174) compared the methods of Ziehl-Neelsen, Much, and Gasis, and came to the conclusion that Ziehl-Neelsen's method, especially for practical use, is indispensable because of its simplicity and rapidity; that although Much's method demonstrates granules which are not always apparent by Ziehl's method, it is less easy and less distinct than that method, and is therefore not to be recommended as a rapid method. In addition, *in mixed infections it may very easily lead to false conclusions*. The staining method introduced by Gasis, in which the film is stained in the first place with an acid dye, is recommended by Berger as displaying, as accurately as is possible, the structure of the tubercle bacillus.

In contrast with Ziehl's method, Gasis' method has the disadvantages of being very complicated, and of introducing many difficulties.

In connection with Much's work a note of caution is sounded by Ira van Gieson (*Medical Record*, New York, 9th July 1910, p. 52), whose name will carry weight in pathological circles, and we should have expected that criticisms of this kind would have appeared at an earlier date, seeing that the difficulties in the interpretation of Much's results, to which van Gieson refers, must have occurred to many others besides myself.

Van Gieson discusses the question under the attractive title of "The Paradox of the Tubercle Bacillus," this familiar paradox being synonymous with the contradiction encountered in finding no tubercle bacilli under the microscope, but still proving their presence by the results of animal inoculation with companion portions of practically identical material. According to Much and his followers, this problem has been solved. Van Gieson points out that both in sputum and in tissues numerous acid-fast particles are found associated with, and subject to confusion with, the tubercle bacillus. In systematic examination of large numbers of sputa in sanatoria, these appear in probably about 5 per cent. of the daily examinations. They are probably fatty food particles, as similar structures are to be seen in various fatty elements of food when stained by Ziehl's method and decolourised with acid-alcohol, or with Pappenheim's rosolic acid solution.

Old cheesy material, in which it is notoriously difficult to demonstrate tubercle bacilli, contains certain members of the fatty series, the

particles of which are acid-fast, and may appear under the guise of derivatives of the tubercle bacillus. Faeces show these acid-fast fatty particles quite frequently.

"Applying his modified method to material which was absolutely barren of bacilli by the conventional Ziehl's method, he concluded that these invisible bacilli had escaped detection by methods which depend on the property of acid-fastness, by losing this quality, and had become transformed into these unfamiliar structures of isolated, apposed, or clustered granules and tiny stavelets."

Van Gieson feels that a good deal of Much's work and his deductions are fallacious, and that they add confusion to the subject. "He has apparently fallen into one of those cleverly masked traps which beset every turn of the scientific investigator."

"Cheesy material shows an amazing complexity of organic structure and wealth of chromatin particles, emerging from hosts of leucocytes in all stages of degeneration. It is remarkable how these persist with their hosts of extruded chromatin filaments and myriads of 'granules' and 'Stäbchen,' mimicking perfectly what might be expected of non- and fast tubercle bacilli."

"Undoubtedly, in many of the structures described by Much there are involuting or aberrant types of tubercle bacilli, but the critical point still remains that he has not eliminated the mimicry of granules acid strands from the surrounding dying or degenerating cells."

In justice, I must add that both Much and Weiss, to mention only two of the authors favouring the method, refer to suggestions which had been made, that many of the granules demonstrated by the method were degeneration products, and they claim to have disproved this possibility.

OPHTHALMOLOGY.

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THE SURGICAL TREATMENT OF STRABISMUS.

At the present time there is no unanimity as to the best methods of dealing with the correction of strabismus surgically. Some pin their faith almost exclusively to the older method of tenotomy, either by the subconjunctival or by the open method. Others prefer advancement of the so-called weakened muscles, *e.g.* in convergent strabismus they prefer to advance the two external recti muscles, and in very extreme cases combine double advancement with tenotomy of the internal rectus muscle of the squinting eye, and so on.

In a most interesting paper published by Howard F. Hansell, M.D., Philadelphia (*Ophthalmology*, October 1909), the author states, and we think correctly, that the propriety of operating and the choice of operation in the cases of manifest strabismus demand knowledge (1) of the cause, (2) of the complications, and (3) of the degree. He assumes as a necessary preliminary in all cases that the visual power and refraction are known, and that non-operative measures have failed to co-ordinate the eyes. He confines himself, in his paper, to functional squint only, paralytic deviations and those due to visible organic changes in the media and retina being excluded, thus narrowing the subject to a consideration of the common cases of convergent strabismus associated with hypermetropia and divergent strabismus associated with myopia.

1. *Hypermetropic Convergent Strabismus*.—A large proportion, probably 90 per cent. of the cases of convergent strabismus, are hypermetropic. Donder's theory, announced fifty years ago, and practically unmodified since, of the relation of accommodation and convergence is, the author considers, an entirely satisfactory explanation. Relative accommodation and convergence, or the loss or modification of the independent action of these functions, may serve to explain in part the reason why all hypermetropes do not squint, or why convergent squint is present in some cases of emmetropia and myopia. The instability or undue susceptibility of the nervous system to influences of heredity or environment as an etiological factor is undoubted. Whatever be the true *inwardness* of convergent strabismus, it is, in its incipency, unquestionably a functional affection to be cured by continued therapeutic paralysis of accommodation, and by restoring the normal balance between accommodation and convergence by the use of convex glasses. But after the period of functional imbalance is passed, at about the sixth year of life, although the limit is subject to individual variations, and organic changes in the brain centres, in the ocular nerves, or in the ocular muscles, have set in, upon the nature of these changes depends the character of the surgical measure to be resorted to. The atrophy of the brain cells in the fusion centre, or the loss of conductivity of the nerve fibres from the centre to the termination in the muscles is problematical, and does not concern us in those cases capable of cure by operation. Our sphere of operation embraces the muscles only. If the excessive use of the accommodation enforces excessive use of convergence and disruption of the co-ordination of both, there must be either stimulation of the third nerves, or loss of function of the sixth, with corresponding increase of muscular response (power) of the internal recti, of the external recti, or of both. If the former, tenotomy of one or both interni is indicated; if the latter, advancement or resection of the externi. In accordance with Donder's theory, tenotomy is the proper pro-

cedure, and this operation has long been the popular one. Many cures have resulted, and also many failures to cure. The causes of the failures have not always been those of faulty technique. Operations done by experienced men have been ineffective in cases of good vision in each eye. The blame has been laid on the absence of the fusion sense or loss of fusion power, and, perhaps, justly. The cause of the successes is the mechanical adjustment of the insertions by which the balance of power has been restored. Tenotomy in high grades of convergent strabismus cannot be expected to bring about adjustment, at least permanently, because graduated section, or even tenotomy of the entire tendon, with preservation of the secondary insertions, will give an under correction, and a complete division of one or both interni will almost surely lead to divergence after some months have elapsed. The author states we have all seen too many cases of this kind. Measurements of the degree of convergence do not give identical results, whether they are made by the perimeter or by the prismatic estimation of the distance separating the false from the true image, but slight deviations are not important factors in the determination of the operative method. Hansell's experience has led him to believe that the careful division of the whole tendon at its insertion, without interference with the secondary attachments, is efficacious when the deviation is 25 per cent. or less. The operation of former times, the division of all the connecting fibres as well as the tendon, should not be undertaken in any case. For degrees higher than 25 per cent., double external rectus advancement has been the operation that has proved most successful in the author's hands.

Of all the procedures for advancement that he has tried, that proposed by Wootten is the most satisfactory. Several modifications of inserting and tying the sutures have been proposed, and, while some have the advantage of easier withdrawal of the threads, the advantage is more theoretical than real, for the threads may remain indefinitely, and should be removed when they become loose, or are creating inflammation.

In deciding upon operation the factors to be considered are:—Is shortening of the external recti muscles superior in its results to lengthening of the internal recti, and should we add to the strength of the weak or lessen the power of the strong? If tenotomy is based on the proper principle, and is efficacious in curing *esophoria* and low grades of *esotropia*, i.e. latent and manifest convergent strabismus respectively, it seems logical to apply the same method to all grades, irrespective of their degree. The objection to this reasoning is suggested by experience, and sustained in a measure, at least, by theory. In the case in which either eye may be used for fixation, the eye used depending more on accident than design, any operation conservatively done, which will bring the visual lines

approximately parallel, will pave the way for binocular vision—a result finally accomplished and retained only by the centres in the brain through the ocular nerves. It should be borne in mind that the fault is not in the muscles themselves, which are in the beginning neither too weak nor too strong. We can attain our ends by muscular operations only because we bring the images of the two eyes within merging distance from each other. By mechanically changing the position of the retinal image nearer to the fovea, we compel the brain to abandon its former practice of monocular vision, and to substitute for it the unaccustomed exercise of its fusion power. It is possible that the proximity of the images to each other creates a power of fusion in some individuals, certain it is that it stimulates and develops it. By admitting this supposition we are able to harmonise our conflicting ideas and experiences, and to understand how tenotomy may be the proper method in certain patients and advancement in others, and how unskilfully performed operations of either kind must be unsuccessful. The third nerve theory, based on the relation of accommodation and convergence, is correct, but treatment based on it is sometimes wrong. Too much accommodation means too much convergence; equivalent to saying convergence is too strong, and to cure it tenotomy is proper. The fact is that convergence is overstimulated while the muscles of convergence are of normal strength. Adduction is weakened, but the externi are as strong as ever. Restoration of co-ordination is the cure. This is accomplished in early life by atropine and glasses, and later on by bringing the factors into closer relation, so that by exercise and development of mental power co-ordination may re-establish itself.

For these reasons Hansell has abandoned tenotomy in high grades of strabismus, and performs only Wootten's operation of advancement. The relative position of the eyes during the first few days after the operation is rather suggestive of failure, the improvement is so slight, and one feels as though tenotomy should be performed before the healing is complete. It is essential that both eyes should be bandaged for four days, the bandages removed once a day for the purpose of cleaning the eyes. Subsequently, under atropine or glasses, the visual lines slowly become parallel. The conjunctival sutures may be removed at the end of a week, the deeper sutures allowed to remain for weeks or months. This operation is to be recommended, provided (1) the squint is concomitant, (2) that it exceeds 25 per cent., (3) that the technique is closely followed, and (4) the eyes are bandaged for four days. The only failure the author has met with in the last two years was in a young man in whom either the operation was not well performed, or the suture became detached. In one case it succeeded after a tenotomy, made three years previously by a capable operator, had signally failed.

In the other class of hypermetropic strabismus, namely, that in which amblyopia in one eye is present, the Wootten advancement operation has not been successful in Hansell's hands. In these cases we are dealing with an entirely different proposition. We operate to cure the deformity, and we have given up the hope of the acquisition of binocular vision. The fusion centre cannot be stimulated by the closer relation of the two images, because the brain refuses to recognise the image of the amblyopic eye. The union of that blurred image with the other means confusion, so nothing is to be gained by it. The theories applicable to concomitant squint do not hold. Originally the amblyopia was as great a factor as the hypermetropia in causing the squint, and unless both causes may be removed, we cannot hope to cure on the same lines of treatment. If the amblyopia can be cured, the case will be brought into the category of concomitant squint, and treated accordingly. The operations to be preferred in the amblyopic cases are, for the higher grades, advancement of both externi and tenotomy of the internus of the squinting eye; for the lower grades, advancement of externus and tenotomy of the internus, both confined to the squinting eye.

2. *Divergent Strabismus associated with Myopia.*—Confirmation of the theory elucidating the reasons for strengthening the weakness in preference to lessening the strength of the apparently too powerful muscular combination is furnished by the history of the development of the divergent squint of corrected high myopia or uncorrected moderate or low myopia. No claim has been made, or justly can be made, that the common form of functional divergence is the result of excessive power of abduction or a gain in the individual strength of the external recti muscles. With loss of accommodation and the mechanical obstacles to convergence incident to the lengthening eyeball, adduction is diminished and loss of abduction becomes relatively greater. The power of rotation of each eye is preserved, and the muscular structure remains unchanged, until, from disuse and the habit of turning the head to relieve the overburdened interni, the muscles atrophy. The methods of determining the arcs of rotation, as Howe terms them, furnish little or no reliable information as to the functions of divergence or convergence, and cannot safely be used as guides in the decision as to the nature of the operation. The perimeter measurements, while probably as accurate as those of other instruments, will define the degrees and the limitations, but we learn only their relative values. Strabismic eyes are, as a rule, capable of full rotation, because the muscles are not faulty. Moreover, should we learn that the inward rotation is inferior in its arc to that of the outward rotation, we are not justified for this reason alone in concluding that abduction is too strong, and should be reduced by tenotomy of the external recti muscles, nor on the

other hand that adduction is structurally weak, and that advancement of the internal recti muscles is the proper operation. In considering the etiology, and, therefore, the treatment, we must go deeper than the eyes, and study, if we can, the real sources of the loss of co-ordination. If high myopia is the cause, the defect is deficient convergence, not relative but actual, in the presence of probably full muscular strength of each internal rectus or the average degree of inward rotation when the eyes are tested separately. External tenotomy, single or double, will increase temporarily—and if the operation is extensive, permanently—the inward arc by laming or destroying the outward arc, and although the patient may be able to use his eyes better at the reading distance, because the cornea has been mechanically turned inward, the power of convergence is thereby increased. Binocular vision at 14 inches means, as the result of tenotomy, homonymous diplopia outside of that distance. With the correction of the optical defect, giving both eyes approximately equal vision, convergence may be restored and maintained by double advancement, provided the images are thus artificially brought near enough to each other to stimulate to action the natural forces of fusion.

DERMATOLOGY.

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A RELATION BETWEEN CHICKEN-POX AND HERPES ZOSTER.

IN 1892 Professor Bokay raised the question as to whether, under certain conditions, the as yet unknown virus of chicken-pox did not manifest itself as a zoster eruption instead of as the usual general skin eruption. His attention was first drawn to the relationship between chicken-pox and herpes zoster by typical cases of chicken-pox arising in other members of a family a few days after one of them had suffered from a thoracic herpes. He has noticed a similar condition occur in 9 cases altogether. In all there was a typical herpes zoster, either abdominal, thoracic, or facial, followed after 8 to 20 days by a characteristic outbreak of chicken-pox where there was no other source of infection by chicken-pox to be discovered. Henoeh, writing in his book on *Diseases of Children*, 1892, and describing the eruption in chicken-pox, mentions the fact that in chicken-pox the eruption, instead of being widespread, may be more or less localised with closely-set vesicles, especially in areas exposed to pressure, *e.g.* tuber ischii and

back, and that the eruption in such cases has a zosteriform arrangement. Similarly in Ziemssen's *Handbook of Special Pathology and Therapy* this zoster-like arrangement of the vesicles, together with the other usual eruption, is described. A similar arrangement of the eruption of chicken-pox in groups is also recorded by others within the last year or two, Swoboda going so far as to say that in some cases a confusion of the two diseases may arise. Therefore there is no doubt that in some cases of varicella, besides the general eruption, there are groups of chicken-pox vesicles arranged in a zosteriform manner. So far there is no record of the two diseases occurring in the opposite relation, viz. herpes zoster following a varicella.

Professor Bokay concludes that the at present unknown virus of varicella may, under certain unknown circumstances, give rise, instead of to a general eruption, to a zoster eruption—a zoster varicellosa.

HERPES ZOSTER WITHOUT ERUPTION.

Under this somewhat anomalous title Minet (*L'Echo médical*, 20 Février 1910) records a case where a hospital nurse, who had been attending 3 cases of herpes zoster, developed sudden neuralgic pain in the back of the knee and leg. The pain was so severe as to prevent her walking. There was also tenderness to pressure down the back of the thigh and hyperæsthesia. There was slight rise of temperature, which lasted a few days. A lumbar puncture was performed, and the cerebro-spinal fluid showed a marked lymphocytosis. The pain gradually subsided, and in a fortnight the patient was quite well. The author considers this a case of herpes zoster in which no eruption appeared. He gives an account of a few other similar cases in the literature, and draws attention to the fact, which was pointed out long ago, that the degree of neuralgic pain in herpes is not proportionate to the extent of the eruption. The pain is the chief part of the disease, and often precedes the appearance of the eruption. Sometimes the eruption comes partly out, and then is aborted before true vesicles are formed. In such cases the pain may be very marked. He concludes, therefore, that there is no reason why cases should not occur in which the eruption never comes out at all. He considers that such cases can be diagnosed by the onset of sudden neuralgic pain limited to an intercostal nerve or nerve of one of the limbs, a slight rise of temperature, and a lymphocytosis of the cerebro-spinal fluid. These are sufficient for the diagnosis of herpes zoster, especially if the patient has been recently in contact with a case of herpes.

THE USE OF SYPHILINE IN THE DIAGNOSIS OF SYPHILITIC LESIONS.

The use of tuberculin in v. Pirquet's skin reaction is now a well-established aid to diagnosis in doubtful tuberculous lesions. Following

the same principles, Nicolas (*Soc. méd. des Hôp. de Lyon.*, February 1910), Favre, Gautier and Charlet have applied the same method in the diagnosis of syphilis. As the treponema pallidum could not be obtained in culture, they made a concentrated extract of the liver from a congenital syphilitic fetus, which contains the treponema in great numbers. This extract was mixed with glycerine, and heated to 115° C. to sterilise it. This substance, so obtained, they have named syphiline. When applied in the ordinary way, as in v. Pirquet's tuberculin reaction, only a few doubtful reactions were obtained, but by the intra-dermic inoculation method, using syphiline diluted one-half or one-third by salt solution, very interesting results were obtained. Out of 29 syphilitics in 13 cases a very marked positive reaction, with redness and infiltration, was obtained; in 4 cases a slight positive reaction was seen; and in 5 a doubtful reaction. In 7 cases there was a negative result. The most marked reactions were obtained in tertiary syphilis, where all 5 cases gave a marked positive reaction. The secondary syphilis cases reacted less regularly, and the primary cases least of all. It was also noticed that females reacted better than males. In one case of congenital syphilis a doubtful reaction resulted. Nine cases definitely non-syphilitic were also tested, all with negative result. The authors put forward the method as one likely to be very valuable in the diagnosis of syphilis.

THE USE OF CALCIUM OXY-CHLORIDE IN ERYSIPELAS AND CHILBLAINS.

Ehrenberg (*Berliner klin. Wochenschr.*, 1st November 1909) recommends very strongly the use of calcium oxy-chloride as a local application in cases of erysipelas. Fifteen cases were treated, and in all very good results were obtained. The calcium oxy-chloride was applied in the form of an ointment (5 to 10 per cent.) in soft paraffin. By this method it is claimed that the temperature came down, in the majority of cases, in 2 or 3 days, as compared with 8 or 9 days by the methods used formerly, including the use of antistreptococcal serum. There were no complications and no deaths. The writer admits that the number of cases treated is still too small to base definite conclusions upon, but recommends the method for further trial. Binz has used the same ointment for treating chilblains, with good results. The ointment should not be stronger than 5 per cent. In one case a severe dermatitis was produced, but whether this was due to an idiosyncrasy on the part of the patient, or to an impurity of the drug, or a mistake in the compounding of the ointment, it was not made out. The ointment should be rubbed in once in the 24 hours, not too vigorously, and not into any area where the skin is already broken. It is a good plan to apply the ointment to one small lesion first, and see if any idiosyncrasy to it is present, before applying it to all the lesions.

VASOMOTOR AND TROPHIC CHANGES OF CEREBRAL ORIGIN.

Under the above heading Ingelrans (*L'Echo médical*, April 1910) gives an account of the different circulatory and trophic changes seen in cases of paralysis of cerebral origin. In hemiplegias due to apoplexy the hand and foot often show a violet-red colouration, which disappears on pressure, leaving the skin a livid white colour. Frequently there is also oedema around the ankle and of the hand. This oedema may be permanent, in which case the limb becomes hard and violet coloured. The badly nourished skin is an easy prey to outside infections, resulting not infrequently in boils, sloughs, or gangrene. Trophic changes also occur in the nails. These lesions occur usually some time after the paralysis is established.

Ingelrans describes a case of left-sided hemiplegia due to apoplexy where, the day after the onset, the left hand and lower part of arm became greatly swollen, the skin became red as in erysipelas, and a few days later, on the left hand, a pemphigoid eruption appeared, with hemorrhages under the nails. Over the thenar eminence there was a bleb as large as a hen's egg. It ruptured, and was seen to contain a yellowish serous fluid. On the back of the fingers were two similar blebs, and on the back of the hand several smaller blisters. Over the left trochanter was a large oval slough. The writer cites several similar cases previously published.

Pruss has shown that there exist in the corpus striatum vaso-constrictor centres, and in the optic thalamus vaso-dilator centres, and Parton was struck by the almost constant presence of a lesion in the corpus striatum in cases where there was marked oedema, hemorrhages, or pemphigoid eruptions in cases of hemiplegia. It has been shown that the destruction of the cerebral cortex in the dog is followed not only by a motor paralysis, but also by a vasomotor paralysis corresponding to the area destroyed, and leading to a rise of temperature in the limb due to an engorgement of the paralysed blood-vessels. Stimulation of the cortex of the brain also leads to a contraction of the vessels of the part supplied. It is well known that the chief vasomotor centre is found in the medulla, but these may be connected with the cerebral cortex. In the case described by the author there was no cause for the skin changes except the cerebral hemorrhage, but he points out that such changes are much more frequent where, in addition to the brain lesion, there is also a cardiac or renal lesion as well. In the latter cases both conditions contribute to the change in the skin. He concludes, from a study of his own and the reported cases, that in hemiplegia, where there are rapid vasomotor and trophic lesions in the skin, such lesions are due to interference with vasomotor centres in the brain itself, which are intimately connected with the vasomotor centre in the cord.

THERAPEUTICS.

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RECENT WORK ON PURGATIVES.

WITHIN the past few years our views on the action of purgatives have been overturned by the investigations of several workers. Thus, the effect of the purgative on the gastro-intestinal movements has been followed on the X-ray screen. By this method Magnus¹ investigated the action of senna and castor oil on cats. He found that senna did not alter the peristalsis of the stomach or small intestine, but greatly increased the peristalsis of the large intestine. Further, as soon as the drug reaches the cœcum it causes a reflex defæcation movement. Castor oil did not hasten the emptying of the stomach, but increased both the peristalsis and pendulum movements of the small intestine. By abolishing anti-peristaltic movements in the first part of the colon, the intestinal contents pass through the large intestine in a more liquid state, and retain this consistence till they reach the rectum. Another investigator, Padtberg,² using the same method, found that colocynth was uncertain in its action on the stomach, but constantly increased peristalsis in the small intestine, and, by diminishing antiperistalsis in the large intestine, allowed the fæces to pass through the large gut into the rectum more rapidly and in a more fluid form. Hertz's³ observations were carried out on man. In constipation he found that cascara produces increased activity of all parts of the intestines. In a later investigation⁴ on saline purgatives he comes to the conclusion that saline purgatives do not act by their osmotic properties (retaining water in the bowel without being absorbed), but act on the neuro-muscular mechanism chiefly of the colon. He holds that the saline purge is partly absorbed from the stomach or small intestine into the blood, from which it reaches the colon, acting on the neuro-muscular structures, and producing both increased motor and secretory activity. In further proof of this theory he shows that the rate at which bismuth passes along the small intestines is not increased by the simultaneous administration of a saline purge, and that purgation is effected before the salines reach the colon by the bowel. The contents of sodium sulphate in the watery stool passed after the administration of the saline purge was only slightly greater than in a normal firm stool, while a subsequent firm stool contained a much greater excess of sodium sulphate. The absorption of the salt is also shown by the increased percentage of, and in the absolute amount present of, the urinary sulphates. Tyrode⁵ has also investigated the mode of action of saline salts. His experiments were carried out on isolated portions

of rabbit intestine preserved in a suitable nutrient medium. Like Hertz, he discards the osmotic explanation of the action of the saline purges. The salines increase the peristalsis of the intestine, but not the fluidity of the contents, when introduced into the gut. His conclusion is that the neutral salts owe their purging properties, not to their physical properties, but to their chemical constitution. Though they may induce a certain amount of osmotic change by their hydroscopic character, the paramount action is of a reflex nature on the neuro-muscular structures in the wall of the gut. The resultant increase of peristalsis is thus a local reflex in the neuromuscular mechanism, emanating from their stimulant action on the mucous membrane, and is a more or less specific action dependent on the chemical composition. Thus, while Hertz holds that the salts reach the colon by the blood-stream after absorption, Tyrode shows that the direct introduction of the salt into the gut produces a local reflex increase of peristalsis, while both discard the physical explanation of the purgation as due to increased retention of fluid by the osmotic properties of the drug.

The purging action of the organic (phthalein) group of purges has been investigated by Abel and Rowntree.⁶ They prepared over a dozen derivatives of phenolphthalein, and found in phenoltetrachlorphthalein a body which can be used as a subcutaneous purgative remedy. Like phenolphthalein, it is non-irritating when applied to mucous membranes, or when injected subcutaneously dissolved in oil, but the sodium and potassium salts in watery solution are highly irritant when injected subcutaneously. Both phenolphthalein and the tetrachlor derivatives exert a purgative action when dissolved in oil and injected subcutaneously, but the action of the tetrachlor derivative is much more prolonged. Practically all the drug is absorbed into the general circulation in from 16 to 24 hours, and is excreted in the bile, in which, in a dog with a biliary fistula, it can be detected for from 2 to 3 days, and in the feces of a normal dog for 5 to 6 days. Part of the drug is re-absorbed again by the large intestines, but none escapes in the urine. In a subsequent paper Rowntree⁷ records the clinical effect of subcutaneous injections of an oily solution of the drug in the treatment of constipation. Owing to its insolubility in water, the drug cannot be given in aqueous solution, but neutral olive oil dissolves it to the extent of 0.2 gm. in the 10 cc. The oil is first slowly heated to 210°, and the finely-powdered drug is added with stirring. This solution is not irritating. In doses of 0.2 to 0.3 gms. the tetrachlor body proved rather unreliable, but 0.4 gms. dissolved in 20 cc. of oil injected into the gluteal region gave excellent results in chronic constipation. The laxative action is comparatively slowly produced in 18 to 24 hours, and so, as a rule, is not apparent till the day following the injection, but then it persists for several days. This

prolonged action is one of the most striking phenomena produced by the drug. It is not severe in its effect, being laxative rather than purgative. The results are fairly constant, and there is absence of crampy pains and colic throughout the period of its action. Though efficient, non-toxic, and non-irritant when given dissolved in oil, the low solubility in oil is likely to restrict the use of the drug as a subcutaneous purgative. Still, it may prove of value (1) in coma; (2) where marked gastro-intestinal irritability contra-indicates the administration of a purge by the mouth; (3) in the insane who refuse drugs by the mouth and resist enemata; (4) in certain cases of chronic constipation; (5) and possibly, after abdominal operation, to procure regular daily purgation for the first week.

¹ Pflügers *Archiv.* 1908.

² Pflügers *Archiv.*, 1909, vol. cxxix.

³ *Proc. Royal Soc. Med.*, February 1908.

⁴ *Guy's Hosp. Reports*, vol. lxiii.

⁵ *Archiv. Internat. de Pharm. et de Ther.*, 1910, vol. xx., fasc. iii. and iv.

⁶ *Journ. Pharm. and Exp. Therap.*, August 1909.

⁷ *Journ. Amer. Med. Assoc.*, 29th January 1910.

ABORTIVE TREATMENT OF SYPHILIS.

Hallopeau has had encouraging results in the abortive treatment of syphilis. His procedure consists in an energetic local treatment (inunction and local injection of arylarsonates), followed by prolonged, systematic treatment with mercury and iodides. In five out of six cases of chancre he was able to prevent the subsequent development of the disease, and in the sixth case the secondary symptoms were slight and transient.

The theoretical considerations on which the treatment is based are as follows:—At first the spirochaetes are not in the blood-stream, but are chiefly in the immediate neighbourhood of the initial lesion, *i.e.* in the tissue surrounding the chancre, and in the lymphatics and glands supplying the part. By an energetic local treatment the attempt is made to cope with the disease while it is still local, and the general treatment aims at the destruction of any spirochaetes which may have escaped into the blood-stream.

The local measures used consist in the injection of hectine, together with the application to the chancre of a strong (30 per cent.) ointment of atoxyl, or, if the ulceration is extensive, of 10 per cent. ointment of calomel. The arsenical preparation, hectine, is supposed to be less toxic than atoxyl or arsacotin. Chemically, it is the sodium salt of benzo-sulphono-para-amenophenylarsinic acid, and contains 21 per cent. of arsenic. The daily dose is 20 cms., or, in the case of weakly persons, 10 cms., with which is combined 1 per cent. of novocaine to remove the

pain. This quantity is injected daily under the chancre and the neighbouring tissue, and along the lymphatic tract to the glands. To cope with any spirochaetes which escape the local treatment, benzoate of mercury is injected daily into the gluteal muscles for 15 to 20 days, and, thereafter, mercury is administered by the mouth or by inunction. To reduce still further the chances of any spirochaetes surviving, 15 to 30 grs. of potassium iodide are given daily. The active treatment is kept up till the end of the incubation period of the secondaries, but till the end of the tenth month Hallopeau advises intermittent treatment, viz., every fifth or sixth day a local injection of 10 to 20 cms. hectine, and every month an intramuscular injection of benzoate of mercury or inunction of mercury. The disappearance of Wassermann's reaction is a useful check on the length of the treatment. The efficacy of this mixed treatment is shown by the fact that in the five patients 432, 261, 239, 164, and 119 days had elapsed since the chancre without other symptoms appearing.¹

ALCOHOL.

Starting with the view that in the diseased human patient the conditions are too complicated to obtain a clear insight into the value of alcohol as a stimulant, Alexandroff² has carried out a series of experiments on rabbits, in which conditions comparable to those in which alcohol is employed clinically have been produced artificially. Thus, by the administration of diphtheria toxin a condition of cardiac depression is produced, and by the injection of an infusion of hay a fatal febrile infection can readily be obtained, while simple exhaustion was brought about by injecting enough strychnine to keep the animals for several hours in a state of continuous reflex spasm. The quantity of alcohol given was comparable to that employed clinically, but it was given intravenously. It was obtained by mixing 2 parts of a rum containing 50 per cent. alcohol with 3 parts of Ringer's solution; of this 1 cc. was injected into the marginal vein every five or seven minutes till six doses had been given. The recorded results are not very favourable to the view that alcohol is a valuable circulatory stimulant, but it seems to have some effect in increasing the amplitude of the respirations. In the diphtheria experiments the expired air was increased by 40 per cent., but the circulation was depressed. Though the pulse-rate was not altered, the blood-pressure, pulse amplitude, and amount of blood passing in a given period of time were all diminished. In the strychnised animals the action on the respiration was less marked, while the circulation remained practically unchanged, either for good or bad. In the acute infection the amplitude of the respirations was again slightly increased. The blood-pressure was diminished, but, as the amplitude of the pulse was

increased, while the rate was only slightly diminished, probably the circulation was little affected. This depressing action on the circulation corresponds fairly well with the results recently published by Dennig, Hindelang, and Grünbaum³ after investigating the action of alcohol on the circulation when administered to human beings suffering from fever.

¹ *Bull. gén. de Thérap.*, vol. cxix. No. 15.

² *Correspond. Blatt. f. Schweiz. Aerzte*, 1910, No. 15.

³ *Archiv. f. klin. Med.*, 1909.

NEW BOOKS AND NEW EDITIONS.

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London: Methuen & Co., Ltd. Price 21s.

DR. ARCHDALL REID is favourably known as a copious and philosophical writer on the subject of evolution. In the present volume of 500 pages his previous work on the *Principles of Heredity* has been modified in view of recent investigations on the laws of heredity.

The subject that Dr. Reid has chosen is very large, and one about which we really know the mere elements. It is evident, therefore, that in order to write such a book it must not be confined to a statement of facts and inductions from them, as that could really form material for only a small fraction of the pages occupied. In his third chapter, therefore, the author devotes the most of its space to what he calls the Method of Science, and indicates in it that which he has adopted here. Frankly, his method is the old deductive form of reasoning where the investigator takes an hypothesis suggested to him by a few facts, and then looks about to collect the additional ones necessary to support this hypothesis. In the process he usually succeeds only in adapting his facts to his preconceived idea. There is no doubt, however, that this form of research has done great service in advancing science, and it is well illustrated by such an hypothesis as Weismann's *Continuity of the Germ Plasma*; but upon the whole it is not one that should be relied on or practised, unless under circumstances of dire necessity. If one looks over the field of biological science, the difference between the work accomplished by deductive reasoning and that by the observation of facts and induction practised by such great observers as Darwin and Mendel is most conspicuous. Indeed, Mendel's work, his patient experimenting for ten years without any hypothesis at all, until his task was finished, has done more for evolution than all the many hypotheses and speculations with which biology has been afflicted. Thus the author in his voyage in search for the laws of heredity has clambered on the

biggest bit of wreckage of the gallant ship Darwinism—Natural Selection—hoisted his flag of hypothesis and deduction, and gone out into what is in many respects the unknown.

In the first chapter the subject of the characteristics of living beings is considered. Here a popular account is given of the cell, the germ plasma forming it, and so on—upon the whole very accurately, and one can read between the lines that the author knows more than he states. There is, however, one regrettable error in the chapter, namely, where he says that "germ cells derived from a female body (for example a woman) are termed ova; whereas those derived from a male body are termed sperms. *They* are not male and female; only the bodies, the cell-communities which they inhabit, are male and female" (p. 2).

Now here is a very essential error that has misled investigators very much, in regard to such a subject, for instance, as hermaphroditism. What determines the sex of an organism is not the body. The usual concomitant characteristics of the body are merely adjuvant in fertilisation and to the diagnosis of the sex. It is the nature of the sexual gland that settles the question of sex. If it has sperms, then the sex is male; whereas if ova are found (that is to say, actual ova, not mere sperm cells, the forerunners of the spermatozoon), the sex is female.

In the fourth chapter the Lamarckian theory is slain, as it really deserves to be. Lamarck has the greatest credit for the fact that he saw evolution, and did his best, according to his lights, to prove it or give its mechanism. But Weismann has really killed Lamarckianism by showing clearly that acquired peculiarities cannot be transmitted.

In the fifth chapter the question of variability is taken up. In any mechanism of evolution the cause and the transmission of variations are the crucial points. Archimedes said that if he only had a fulcrum he could move the world with a straw. In like manner the evolutionist can say that if he could only explain variation and its transmission, the ultimate conquest of the nature of evolution would be within appreciable distance, so far as man can reach in settling such questions. In discussing the subject of variability, Dr. Reid shows his weak point in this, that after considering the evidence as to it, he urges that natural selection is the great factor. Now natural selection, for instance environment, cannot produce a variation which will be transmitted. We grant that possibly change of soil, change of temperature, and so on, may influence the body of an animal or plant, but the influence is not a permanent one. Natural selection, indeed, is a mere eliminator; that is to say, variations, when they do arise, are eliminated by natural selection if they are unfit for their surroundings. To say, as Dr. Reid says, that if Lamarckianism, for instance, is excluded, there only remains natural selection, is a statement to which the strongest exception must be taken. The difficulty that the evolutionist is in at present is that he knows that variations take place, and he knows that

variations are transmitted. He assumes too often that variation must be caused by the only remaining factor of Darwinism, namely, natural selection. It is almost pathetic indeed to see how our most eminent investigators have tried to get a somatic variation to affect the germ cells and thus be transmitted. There is no such mechanism, and on this point Dr. Reid has seemed to grasp the truth in the way he emphasises that variability is innate in the germ plasma, and that it is a factor in producing it. It would be out of place to discuss at present more fully the points as to the cause of variations, but no progress will be made until the evolutionist definitely casts out of his method of research the idea that a somatic variation can be made causal in the germ cells.

It is not quite fair to pick out isolated paragraphs from a work and to criticise them, but we may give some such quotations to show the difficulties that the author gets into sometimes, owing to his attachment to the doctrine of natural selection. Thus at page 98 he states :

"The conclusion we reach, then, is that, though variations may result from the direct action of the environment, such variations are, in effect, always injuries, and are of rare occurrence in individuals who survive and have offspring. Adaptation (*i.e.* evolution) depends almost exclusively on spontaneous variations. These do not imply damage to the germ plasm, but are products of its vital activity. Occurring in vast abundance all round the specific and parental means, they supply the sole material for natural selection."

"We conceive the germ plasm, then, as living and active, closely adjusted to its environment, growing, dividing, varying, capable of being destroyed and injured, but resisting death and injury, and within limits, capable of repairing damage and returning to its original state—as behaving exactly as a living individual does."

The portion italicised by the author is a summing up as to the germ plasma, in which one statement is negatived by a succeeding one. For instance, the germ plasma is supposed to be capable of being destroyed and injured and yet resisting death and injury, as something separate from the soma and yet as behaving exactly as a living individual does. The whole statement really conveys no additional information on the subject.

The author is therefore a Darwinian, and especially attached to the factor of Darwinism known as natural selection. He is not enamoured of biometry, and makes the naive statement at page 140 that "not seldom in biometric inquiries—as in the case of those inquiries about disease and fertility which we have just examined—several scores or hundreds of observers and thinkers are employed for years in ascertaining, with a much lesser degree of certainty, that which a single thinker may deduce in two minutes from known and admitted truths." Why observations made accurately, and also mathematically

investigated, should be disparaged, and what advantage a single thinker (deductive in his methods, of course,) has over many scores or hundreds of observers, we fail to see. We are not told how the thinker has ascertained known and admitted truths, and indeed if there are any known and admitted truths in regard to evolution, the sooner we are informed of them the better. It is most unfortunate that in evolution the various investigators—Darwinians, Mendelians, biometricians—quarrel so much among themselves, as really they are co-workers and not rivals. There can be little doubt that biometry is one of the very best means of investigation in evolution, and it will make immense progress when once biologists have sifted their facts, and provided the biometrician with what is his most clamant need—sufficient and accurate facts.

The chapter on Mendelism is well done, and the author notes the difficulty of the theory of gametic segregation, viz. the fact that the ratio does not come out in the plants of the first generation. He gives, however, no explanation of this.

In the concluding chapters the bearings of evolution on alcoholism, tuberculosis, and other matters are considered, but here the proportion of theory to fact is excessive. If a race becomes immune to alcohol it should drink more, or as much as its ancestors, and be less affected. Immunity to alcohol, according to Dr. Reid, is, however, an incapacity to be tempted by the narcotic in harmful quantities (p. 456). This is quite different from the immunity conferred by some diseases or by vaccination. Dr. Reid is really comparing a physical result with a mental one.

A perusal of the book shows that the author has read widely, thought deeply, if not always wisely, and in many instances he makes acute criticisms, especially as to Mendelism. Through the whole work there resounds, however, the "broad hippopotamic tread" of deductive reasoning; and although the book could not have been expanded to its present dimensions without that, it is the weak feature in an otherwise praiseworthy attempt.

The Simple Carbohydrates and the Glucosides. By E. FRANKLAND ARMSTRONG, D.Sc., Ph.D. Pp. 112. London: Longmans, Green & Co. 1910. Price 3s. 6d.

IN this, the latest addition to the Monographs on Biochemistry, the standard of the previous publications in the series is well maintained.

Dr. Armstrong's task in making a synopsis of the present position of sugar chemistry has been no easy one, and although from the standpoint of the organic chemist the order which he follows in developing the subject may not appear desirable, the result is quite

satisfactory. The outstanding feature of the work is the able treatment of theoretical questions of constitution, but the use of complete stereochemical formulæ for the five-membered rings, although desirable, may debar readers who are not well versed in stereochemistry from deriving much benefit from this section of the book.

The monograph fills the gap which exists between the advanced text-book and the standard works of Maquenne and von Lippmann, and serves, moreover, to bring the latter up to date in some details. It is to be regretted that Dr. Armstrong did not include a special chapter on practical working methods for the manipulation, detection, and analysis of sugar compounds, or at least include the necessary references in an otherwise excellent bibliography.

Living Anatomy and Pathology. The Diagnosis of Diseases in Early Life by the Röntgen Method. By THOMAS MORGAN ROTCH, M.D.
Pp. 218. With 264 Plates. Philadelphia and London:
J. B. Lippincott Co. 1910. Price 25s. net.

THE aim of this handsome volume is to enable the student to familiarise himself with the Röntgen method of diagnosis, and, whatever our opinions may be as to the possibility of any but those who are constantly engaged in the occupation of reading skiagrams becoming so familiarised, the author has certainly spared no pains to attain his object.

Those engaged in the important field of pediatrics will find much to interest them and gain valuable information from a perusal of the letterpress. We would particularly draw attention to Division II., which emphasises the advantages of considering the *anatomic* age of the child as shown by the development of the bones of the wrist over the method usually adopted of taking into account the *chronologic* age alone. The main importance of the book undoubtedly attaches to the beautiful series of radiographs which adorn its pages and which form a pathological atlas second to none of its predecessors. The value of the work is greatly enhanced by the radiographs of the normal, which are thus always at hand for purposes of reference, and this latter is rendered easy by a carefully prepared index. To beginners in radiology the work should prove invaluable.

Etudes Anatomico-Cliniques (Cœur, Vaisseaux, Poumons). Par le Dr. RAYMOND TRIPIER, Professeur à la Faculté de Médecine de Lyon. Pp. 604. Paris: Steinheil. 1909. 10 francs.

THIS is a thoughtful and instructive treatise upon the more common affections of the heart, blood-vessels, and lungs. The author is an

experienced pathologist as well as a careful and observant physician, and consequently he is able, not only to discuss and explain the etiology and morbid anatomy of the diseases of the circulatory and respiratory systems, but also to write with authority upon the relations existing between the morbid processes and their clinical manifestations. The subjects he selects for discussion are handled in such a manner as to demonstrate the intimate relation between the structural and functional changes in all stages of their evolution. The writer's own opinions are frankly and clearly expressed, and when they differ from those of other writers, his criticisms of the latter are always supported by his own personal observations derived from the wards and the post-mortem room.

Among other subjects dealt with in the monograph are endocarditis, syphilitic aortitis, atheroma of the mitral valve, arterio-sclerosis, pulmonary emphysema, and pleural adhesion. The author's views upon atheroma and arterio-sclerosis are of especial interest, in that they differ so widely from those of another distinguished French physician, M. Huchard. The chapters upon Syphilis and Atheroma in Relation to Disease of the Aortic Valves, Angina Pectoris, and Aneurysm are worthy of most careful perusal; while the chapter upon the Affections of the Heart associated with Diseases of the Lungs, and upon the Pulmonary Manifestations of Cardiac Disease, deals in a masterly manner with some subjects to which the clinician is sometimes apt to attach too little significance.

L'Hypophyse et la Médication Hypophysaire (Etude Expérimentale et Clinique). Par M. le Docteur ARTHUR DELILLE. Pp. 336.
Paris: Steinheil. 1909. Price 6 francs.

DR. DELILLE'S monograph on the pituitary body and the therapeutic uses of pituitary extracts is a valuable contribution to medical literature. Although the study of the internal glandular secretions and of their interaction with one another has cast much light already upon certain obscure clinical syndromes, it is evident that much experimental and clinical research is yet required before many of the problems can be solved satisfactorily. Dr. Delille's work gives an excellent presentation of our present-day knowledge of the pituitary body.

After describing the structural features and chemical constitution of the gland, the author deals very thoroughly with the effects of pituitary extracts upon the heart, the muscles, and the kidney, and upon the nutrition and growth of the body. The changes observed in the pituitary body after removal or destruction of other glands, and the general changes following removal of the pituitary body as well as those produced by the use of a hypophysotoxic serum, are considered. In the third portion of the work the author discusses, from the clinical

standpoint, the effects of pituitary extract in health and in various morbid conditions, pituitary insufficiency and hyperactivity, and the polyglandular syndromes. In the closing pages the therapeutic use of pituitary extracts is carefully considered. The book is well written, and contains many interesting experimental and clinical observations.

Open-Air Treatment at Home: Sanatorium Treatment Continued. By STANLEY H. BATES. With an Introduction by Sir JAMES CRICHTON-BROWNE, M.D. Bristol: J. Wright & Sons. 2s. 6d. net.

THIS is a succinct account, by a non-medical patient, of the means adopted by him for carrying out at home the precepts learned at a sanatorium. The suggestions made in it are, as the author clearly says, not intended as a substitute for sanatorium treatment, but rather as an indication as to how that treatment may be satisfactorily continued at home. It is, so to speak, a post-graduate course of treatment. He points out how "fastidious" is the sensibility of the lungs in respect of fresh air. The rationale of "draught" is explained, being the difference of temperature between inside air and that outside, and the need for keeping these equal is insisted upon. This would seem to be easily done in the shelter in which the treatment was carried out, the latter being very clearly depicted in the photographs shown. The design is a good one, and could hardly be improved upon in its essential features of simplicity, sufficiency of size, and abundance of "aeration" to use the word adopted by the writer. Suggestions are given for the fitting up and furnishing of the shelter, which are the result of sound practical experience, and it is probable that anyone intending to continue a course of open-air treatment after residence in a sanatorium would be well to obtain and study this little work. An excellent preface by Sir J. Crichton-Browne adds to the value of the booklet, and we seem to gather a sense of cheery well-being from the writer indicative of the *mens sana in corpore sano*, which speaks for itself as to the results of what, after all, must be somewhat of a self-denying method of treatment.

The Expectation of Life of the Consumptive after Sanatorium Treatment. By NOEL D. BARDSWELL, M.D., M.R.C.P., F.R.S.(Edin.). Pp. 130. Oxford Medical Publications. Edinburgh, Glasgow and London: Henry Frowde, and Hodder & Stoughton. 1910. Price 3s. 6d.

THE author has traced the after-histories of 241 consumptive patients who received sanatorium treatment under his care from 1900 to 1905.

His results are brought up to 1909, so that the duration of this after-period varies from four to nine years. His purpose in doing so is clearly expressed in the title of the book, and in the preface he makes plain his desire to test impartially the value of sanatorium treatment, not by the results on discharge, but by the condition of the patients some years after their return to ordinary civil life. The cases are divided into definite groups according to the local and constitutional condition on admission and on discharge. This is valuable in allowing a separate study of the results of sanatorium treatment according to the initial severity of the disease; and it shows in a striking manner the great superiority of results in the cases of early disease.

The book is a valuable contribution to a question which is still a matter of controversy—the therapeutic value of sanatorium treatment in pulmonary tuberculosis. In dealing with this question, it applies an exacting test, namely, the condition of the patients some years after cessation of treatment; it deals with an adequate number of cases of representative variety; and by the careful scheme of classification adopted, it allows a very thorough sifting of the statistics from different points of view. The spirit of candour and impartiality in which the writer deals with the subject is highly to be commended.

Hypnotism and Treatment by Suggestion. By J. MILNE BRAMWELL, M.B., C.M. Pp. 216. London: Cassell & Co. Ltd. 1909. Price 5s. net.

IN this handy and tastefully got-up volume of the Modern Methods of Treatment Series, Dr. Milne Bramwell restates his views and rearranges the more important matters already given to the world in his larger work published in 1903. His wider experience has borne fruit, and here we have nearly seventy cases recorded, mainly medical, many of them not previously published. They deal with various forms of insanity, hysteria, obsessions, neurasthenia, dysmenorrhœa, insomnia, sea-sickness, and even skin diseases. He objects to any experiment, however trivial, which could make the patient believe the operator was trying to dominate him. "The whole object of suggestive treatment should be the development of the patient's will-power and of his control of his own organism." The stupid and unimaginative make bad subjects: they are not so easy to influence as the more intelligent. During the twenty years he has practised suggestion, Dr. Bramwell has not seen a single instance in which ill effects, even of a trivial description, have followed its use. In the chapter on Suggestion in Ordinary Medicine and in Quackery, all will find matter of the greatest interest and importance: and Christian Science, "the most dangerous of all forms of modern quackery," is shown up mainly by quotations from its literature.

Surgical Diagnosis. By ALEXANDER BRYSON JOHNSON, Professor of Clinical Surgery in the Columbia University Medical College. Two Vols. New York and London: D. Appleton & Co.

THIS work is dedicated to Charles MacBurney. The author states in his preface that he has attempted to treat the subject of surgical diagnosis upon fairly broad lines, and in addition to a description of methods of examination and the relation of signs and symptoms, he has included pathological data as well as brief histories of illustrative cases. He further states that in preparing the work he has had constantly in mind the needs of the practitioner of general medicine, and it is by him especially he believes that the work will be found valuable.

A wide latitude is given to the term "Surgical Diagnosis." It is to all intents and purposes a systematic treatise on surgery, special stress being laid on clinical signs and diagnosis. It differs, however, from the ordinary systematic work on surgery in that it is only here and there that the mortality of the disease and its treatment are dealt with. For example, under snake-bite we have the treatment described under the heads of local, general, and specific. The illustrative cases are well told; they interest the reader, thus lightening his task, and are certainly instructive. The grouping of the subject-matter is sometimes of the haphazard order. Chapter IV., for example, includes surgical tuberculosis of the skin, glands, bones, and the diagnosis of diseases of joints in general. Chapter VI. again, which deals with diseases of the soft parts, includes delirium tremens and iodoform poisoning. Gunshot wounds receive adequate treatment, and the section on bacteriology and infective conditions is illuminated by a number of temperature charts. Examination of the blood is thoroughly gone into. The chapter on tumours, while well illustrated, is, from the standpoint of surgical pathology, a superficial article; there are included amongst tumours, Hodgkin's disease and elephantiasis. Melanotic tumours, including those which develop from moles, are included with the sarcomata; while psammomata are included amongst cysts.

The eleventh chapter, which deals with X-rays in surgical diagnosis, is a particularly valuable one, and is quite a feature of the book. There is a complete account of the apparatus, the technique, and the diagnostic value of the X-rays in special departments of surgery—fractures, dislocations, foreign bodies, and pathological concretions. We have only noted one oversight under this head—the use of an emulsion of subnitrate of bismuth—this preparation having been given up on account of the risk of poisoning.

In every large work there is bound to be some inequality in the scope with which the different subjects are treated, and it is noteworthy that inherited syphilis and diseases of the pericardium are each dismissed in one-third of a page.

The illustrations throughout the work are of a very high standard. In certain sections they are so numerous and so excellent as to give the chapters they adorn the attraction of a picture gallery. We venture to exclude from this category the illustrations on page 306, borrowed from Henry Morris, showing the position of the kidneys.

As a work on surgery this book attains such a high standard of excellence that we would desire for it a wide circle of readers. What we fear is that, not dealing with the treatment of the affections it describes, it cannot be substituted for one of the existing works on surgery; and in the case of a young practitioner at any rate, it can scarcely be expected he will be in a position to buy both.

Manual of Operative Surgery. By JOHN FAIRBAIRN BINNIE. Vol. II.
London: H. K. Lewis. 1910.

WE congratulate Mr. Binnie on having found it possible to carry out the widely expressed wish that his *Manual* should be made to include other operations than those described in the original volume. We have looked into the second volume of the work with great interest, and have found that it presents the same attractive qualities which, on its first appearance, so quickly established the popularity of the *Manual*. We again find the absence of any plan or system in the direction of making the work a complete guide to the subject of which it treats; he gives, for example, an excellent description of the operations on the arteries, but he stops short at the femoral in Scarpa's triangle and at the brachial in the upper arm.

While keeping himself in the background, and departing altogether from the traditional lines of text-books on operative surgery, he presents the subject in an attractive and original form. He gives the latest procedures, these, in some instances, having only reached the experimental stage; he rarely expresses an opinion on their relative merits, but he always quotes from original sources and conveys the impression that he has seen all the new things which he describes.

Without going into detail, we may say of Mr. Binnie's *Manual* that it is not only one of the most instructive works on operative surgery, but both in the matter of text, illustrations and choice of subjects it presents attractions which are peculiar to itself.

Ionic Surgery in the Treatment of Cancer. By G. BETTON MASSEY, M.D.
Pp. 258. London: Siegle, Hill & Co. 1910. Price 13s. net.

IN the preface to this volume the author states that this work embodies the results of sixteen years' surgical employment of the electrically diffused ions of zinc and mercury in the destructive sterilisation of

cancerous growths, and that it contains a description of the technical and operative details of the method. A chapter is also added on the ionic treatment of tubercular adenitis and of hæmorrhoids. The use of the zinc ion in the treatment of rodent ulcers is well known to be valuable, and in suitable cases a cure may follow two or three applications. Dr. Massey has extended this use to circumscribed carcinomatous and sarcomatous growths, and has supplemented the zinc by the mercuric ion. Instead of a solution of a zinc salt, he uses zinc needles amalgamated with mercury, which he plunges into the periphery of the tumour, the circuit being completed either by a negative pad placed on an indifferent position—monopolar method—or on the tumour itself—bipolar method. Currents up to an ampère are employed, and an anæsthetic is necessary. The notes of a large number of cases are appended. It is claimed that the operation is bloodless, and that, owing to the diffusion of the microbicidal ions into the surrounding tissues, where any outlying cancer cells are destroyed, recurrence is infrequent. In this respect the method is superior to the old treatment by caustics, which otherwise it somewhat resembles.

Surgery of the Brain and Spinal Cord, Based on Personal Experiences.

By Professor FEDOR KRAUSE, M.D., Berlin. Translated by HERMAN HAUBOLD, M.D., New York. Vol. I. Pp. 282, with 63 Figures in the Text, 24 Coloured Plates, and 1 Half-Tone Plate. London: H. K. Lewis. 1910. Price 25s. net.

THE name of Professor Krause stands for all that is most advanced in the surgery of the central nervous system, and we cordially welcome this record of his personal experience, which has been admirably translated into English by Professor Haubold.

In the volume now before us we find a most instructive description of the modern technique of cranial and cerebral surgery. Although essentially based on the author's own work and amplified by references to his clinical cases, the contributions of other surgeons to the subject are freely acknowledged and judiciously criticised.

The size of the page—royal octavo—has enabled the author to furnish a series of coloured plates of the highest artistic merit, and sufficiently large to illustrate all necessary details. The illustrations in black and white are perhaps less satisfactory, but they serve their purpose of elucidating the text. We would venture to express the hope that the absence of a complete index may be remedied in the next volume, to the appearance of which we look forward with much pleasure.

A Handbook of the Diseases of the Nose and Throat. By EUGENE S. YONGE, M.D. Pp. ix. + 407. Edinburgh: William Green & Sons. 1909. Price 9s. net.

THE author states in his preface that this book is intended solely for use in general practice, and for this reason descriptions of rare diseases and major operations have been considerably condensed.

A description of the anatomy and physiology of the parts and of methods of examination precedes each section. There are some excellent illustrations of the anatomy of the nose and of the accessory sinuses. The descriptions of the various diseases of the nose are sufficient; we must, however, protest against Mr. Yonge's statement that the operation of submucous resection of the nasal septum was introduced by Killian of Freiburg. As a matter of fact, Kreig was the first to describe and systematically carry out this operation; Killian introduced a valuable modification of it. We also regret that Mr. Yonge advocates Lack's operation for the removal of polypi when associated with ethmoidal disease; there is no doubt in our minds that, if the operation is to be effective, grave risk must necessarily be incurred in its performance.

The chapters devoted to accessory sinus suppuration are good, but more stress might have been laid on the value of X-rays in diagnosis. There is no doubt that at the present date an X-ray photograph is or should be an essential preliminary to many of the operations on the accessory sinuses.

A further detailed criticism is unnecessary; we must add, however, that the book is well illustrated and well got up, so that it will be an ornament to the shelves of a library.

Public Health, Parts I. to V. Catechism Series. Second Edition, Revised by W. ROBERTSON, M.D., D.P.H., Medical Officer of Health, Leith. Edinburgh: E. and S. Livingstone. Price 1s. net per Part.

THIS catechism in five parts deals with Water; Air, Ventilation, Warming, Lighting, and Climate; Sewage and its Treatment; Vital Statistics, Dwellings and Meteorology; Epidemiology, Food Burial, Water-Closets, Disinfectants, Heating, and Hospitals in each part respectively. It is meant to aid the student in preparing his work for the examinations in medicine as well as the diploma in Public Health. Sanitary law is not dealt with, except under the curious question, What (*sic*) is a "legal infant"? Perhaps intentionally, as imitative of the ways of the *viva voce* examiner, the questions do not follow each other in rational sequence. Some of them might not satisfy an exacting examiner, as, for instance, that dealing with smallpox infection,

from which it would appear that the disease is not spread aërially. In dealing with water filtration no notice is taken of the slime layer on the surface of a sand filter, which is of such importance in rendering the water germ-free. The definition of hydraulic mean depth requires subediting. This little series should prove useful to sanitary inspectors in preparing for examination; for the higher examination in Public Health more accurate information would probably be required.

NOTES ON BOOKS.

THE *Index Catalogue of the Library of the Surgeon-General's Office, U.S. Army* (Second Series), of which we have received Vols. XIII. and XIV., is an indispensable item in every medical library. A glance through its pages brings forcibly home to us the rate at which medical literature grows. Since the publication in 1896 of Vol. I. of the present series, the literature on Appendicitis has so accumulated that it has been thought convenient to publish the references under the heading "Perityphlitis," rather than wait till the appearance of the third series, and we find no fewer than sixty-six pages of closely printed double columns required for this purpose. The references to the Röntgen Rays occupy thirty-five pages, and to Radium six. We note, as a matter of local interest, that under the heading "Royal Infirmary of Edinburgh," we find references to such varied subjects as the "Pharmacopœia of 1763," "Regulations respecting Dresses" (*sic*) (1831), "Reports on Diets," "Letter of Application for the Post of Assistant-Physician," and an Address delivered on intimating a church collection. Equally interesting and varied are the references to our Royal Colleges and Royal Medical Society.

The Nature of Cancer, by John Clay (Swan, Sonnenschein & Co.), is written by an educated man who has read a good many books on cancer, and who thinks that he has hit upon a remedy for that disease. He evidently includes all forms of malignant tumour under the term cancer. With an imperfect understanding of the processes of cell growth, so far as our present knowledge goes, the author has elaborated what he considers to be the requirements of a remedy for cancer. The following extract may be taken as a good sample of his knowledge and method of reasoning:—"We have noticed how oxygen keeps torula from multiplying; as cancer cells are nearly allied to torula, we shall be safe in assuming that oxygen will have the same effect in both cases. If, then, we can obtain a simple chemical solution, or build up a solution from several, which would accomplish this result, we should practically be proceeding on lines which, theoretically and scientifically, would be

sound—especially would this be the case if the solution had a selective affinity for the cancer cells in the way of their destruction in preference to the normal cells of the tissues.”

The author does not divulge the nature of the fluid that he has found capable of fulfilling these theoretical requirements, but we gather that he has used some fluid both as a local application and for hypodermic injection into masses of new growth with unbroken skin. In addition, he seems to employ some internal remedy whose action is based upon the following hypothesis:—“There is a strong possibility of using some specially prepared internal toxic compound which will give immunity to normal tissue cells against loose floating cells which, wandering away from the primary growth, induce the metastases or secondary deposits.” What the internal toxic remedy, however, is which he thinks he has discovered to give this immunity he does not say.

Mr. Clay is apparently persuaded of the value of his method of dealing with cancer. No doubt he will find many patients who suffer, or are supposed to suffer, from malignant disease willing to submit themselves to his treatment. Anyone who advertises a supposed cure can attain to that. Drowning men will catch at straws. Mr. Clay may, of course, have stumbled upon useful remedies, but until he publishes them he is open to the charge of withholding the benefits of his supposed remedy from the many thousands of sufferers from cancer who cannot possibly visit him in person. He publishes a tabular list of cases, but the details given are so vague as to be of no value from a scientific point of view.

An English Handbook to the Paris Medical School, by A. A. Warden, M.D. (J. & A. Churchill), gives very concise information about all the medical professors and teachers, hospitals, medical schools, and laboratories in Paris at the present time. Since the first edition, seven years ago, there have been so many changes in the staffs of the various hospitals, and in the hours of the classes, &c., that the present edition is necessitated. It should prove a very great help to anyone wishing to do post-graduate work in Paris. There is also a useful map showing the situations of the different hospitals.

The recent additions to *Hoblyn's Dictionary of Terms Used in Medicine and the Collateral Sciences*, by John A. Price, M.D. (Geo. Bell & Sons), are quite up to date and accurate; but there are a great many points in which this book is decidedly out of date, *e.g.* soft chancre is classed under primary syphilis. There are many similar statements where the information given is not in accordance with the accepted teachings of modern medicine. To be of real value the older parts of the book would have to be entirely rewritten.

The *Transactions of the American Urological Association*, Vol. III., 1909, edited by Charles Greene Cumston, and the *Transactions of the American Association of Genito-Urinary Surgeons*, Vols. III. and IV., 1908-1909, which we have received, contain a valuable series of papers relating to the specialty with which these Associations are concerned, and afford ample evidence that in this branch of surgery, as in all others, the work of American surgeons is of the first rank.

The fifteenth edition of Caird and Cathcart's *Surgical Handbook* (Griffin & Co., Ltd., London) maintains its well-established claim to furnish in reasonable compass the essentials of practical surgery, and for the student and graduate alike it contains invaluable information. By various additions to the text the present edition is brought up to date. In particular, an account of spinal anæsthesia and a description of several new mechanical appliances have been introduced. Not the least important sections of the book are the appendices, which now number thirteen, but several might with advantage be included in the earlier chapters. Thus the diagnosis and treatment of sinuses are described partly in Chapter V. and partly in Appendix D. The preparations for an operation, which every year are growing in importance, would be better appreciated if the accounts of the various steps were systematically arranged. Many of the page references in the text are wrong, and the index is in need of revision.

The twenty-first volume of the *Transactions of the American Pediatric Society* (E. B. Treat & Co.) maintains the standard of its predecessors, and deals with many interesting subjects. It is only possible to enumerate and very briefly describe a few of the papers. Rotch has an important contribution on "The Position and Work of the American Pediatric Society toward Public Questions," in which he discusses the various standards by which the fitness of the child for physical and mental work is measured. He advances his anatomic index—determined by Röntgenographs of the hand and wrist—as the most reliable guide. Holt gives the preliminary results of an investigation in "The Bacteriology of Acute Infections of the Respiratory Tract in Children, with Especial Reference to Influenza." The bacteriological examinations were of sputum, and of nasal and pharyngeal secretion, in children and adults, both in health and disease; and also from the lungs and heart-blood of some fifty autopsies. When completed, the investigation will be a very important addition to the exact bacteriology of acute respiratory affections. Crozer-Griffiths, under the heading of "The So-called Thymus Death," gives a remarkable history of seven cases of sudden death in one family. In "Some Observations Concerning Scarlet Fever, Rubella Scarlatinosa, and So-called Duke's Disease," Dr. Melton Miller gives a clear clinical description of some obscure

and confusing cases of the exanthemata. Dr. Irving Snow contributes "An Abstract of Finkelstein's View of Infantile Alimentary Intoxication." This summarised translation is of great value from the importance of the subject, the eminence of the author, and the original point of view adopted. Other interesting articles are—"The Urine in the Gastro-Intestinal Diseases of Infancy," by Dr. Lovett Morse and Dr. Bronson Crothers; "Pneumococcic Infection," by Dr. Walter Carr; and "The Stools of the Newborn and their Significance," by Dr. Thomas Southworth.

The third edition of Dr. Charles Lyman Greene's *Medical Diagnosis* (Rebman) contains a great deal of information in small compass, giving an account of the clinical methods used in diagnosis, but also including brief descriptions of the etiology, symptomatology, and pathology of medical diseases. Even the infectious fevers and the diseases caused by animal parasites are described, and the book concludes with a short chapter on Acute Poisoning, with Treatment. It is written, the author explains in the preface to the first edition, for the "overtaxed student and general practitioner." The accounts of methods are concise and accurate, and on the whole sufficient; and in spite of the severe compression there is a distinct individuality of style. The only noteworthy omission is the absence of any account of the Wassermann test. The illustrations are numerous, and, though small, are clear.

Emergency Surgery, by Dr. John W. Sluss, Second Edition (Rebman, Limited), is written for the general practitioner. It is intended to serve as a guide in times of stress. The text is clearly written, and does not suffer from being somewhat dogmatic in style. Almost every conceivable emergency has been mentioned, and if the practitioner has time to consult this book he should find much useful information. The methods of treatment recommended are thoroughly up to date, and although there are many conditions described which the practitioner will rarely or ever be called upon to treat without deliberation, there are, on the other hand, no important sins of omission. The book is fully illustrated, and should prove useful to those to whom it is addressed.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES AND NEWS.

The Profession of Medicine.

IN an educational number, which is presumably read by those parents whose sons (or daughters) are contemplating entering the medical profession, a few words on medicine as a profession will naturally be looked for. Our relatively late appearance gives us the advantage of reading what other medical journals have said, and some of them write of the prospects of the profession in a vein of gloomy pessimism, with which we have no sympathy. We would all like to have larger incomes and less work, and in this desire we are at one with all professions and all trades. If the prospects of the medical profession are so dark as some of our journalistic Jeremiahs would persuade us they are, how is it that so many of us put our sons into it. Medicine is not and never has been a career for those to whom worldly success is the main aim; the words that "medicine is a noble profession and a poor trade" remain as true as when they were spoken. But the man who has chosen his profession deliberately and wisely, who knows his work, who keeps up his work, and who does his work, may confidently look for an adequate living out of it. But the choice must be wise and deliberate. It does not do to put any boy into medicine. Still less does it do, as is said to be the custom in some busy communities, to put the clever boys into business and the stupid ones into medicine or the Church. And though some feeble in body have become great physicians, it is a big risk for a delicate boy to study medicine. The work is very hard, and though the risks in these days of asepsis and antiseptics are infinitely less than they were, not a session passes without evidence that they still exist. The growing tendency to keep boys longer at school is all in favour of a more careful selection, and the more deliberate the choice is, the better it will be for the profession.

If we were asked to put in a word what is the most useful indicant of success in medicine, we would say, sympathy. It is the boy who is

most considerate of the feelings of others who will later make the best doctor. The cold, calculating boy will never make a good practitioner, though he may, if he reaches the upper ranks of his profession, make a financial success, but since the majority of medical students cannot do this, it is wiser to direct the thoughts of such towards business or the law. Medicine is like the Church; only those who have something like a call should enter it.

Clinical Teaching in
Edinburgh.

PROFESSOR SIMS WOODHEAD, in the memorandum appended to the Report of the Treasury Committee on the Scottish Universities, only says, from a more public platform and with a louder voice, what many of us have been saying for years. But when in an appendix to such an important report as this we find the words, "Some modification of the present system is now desirable if the reputation of the clinical teaching in the Edinburgh school is to be raised, *or even maintained*," surely even the most obstinate supporters of the *laissez aller* will be aroused.

The main fact in medical teaching of to-day is the recognition of the all-importance of the hospital as the practical laboratory—as the technical school of the medical student. We have never agreed with those who would do away with all lectures; the systematic lecture may be, and often is most useful, but it is at the bedside, in the side-room, and in the out-patient room that the student must learn to practise what has been preached to him. Of the out-patient department, Professor Woodhead candidly says it seems to be far too little utilised. We agree with him that out-patient work should be supplementary or additional to the ward work, and not preliminary.

Paragraph III. is headed "Overworked Professors," and though the wording is not absolutely clear, we take it that the description applies to all the professors who teach clinically. And the term overworked is applied by Professor Woodhead not only to the teaching, but to the examining of students. We suppose we may all put in a claim to overwork as regards our clinical teaching, but there is no doubt at all that the term is abundantly applicable to the examiners.

As a solution of these difficulties, Professor Woodhead puts forward the suggestion which has repeatedly appeared in our pages, that all the physicians and surgeons to the Infirmary should be University lecturers *and examiners*. The weight of teaching would be lessened, and we are sure the students would benefit from the lightening of the burden of examination. Strict insistence on two examiners for every student would prevent any possible abuse of the fads of an individual.

Professor Greenfield's successor will admittedly not be a clinician, and it would seem that his retirement would be the occasion for the

University to appoint a Professor of Clinical Medicine who would be the chairman of a Board of Lecturers on Clinical Medicine, and responsible for the general direction of the teaching of that subject.

But, say the objectors to this scheme, that is all very well, and would be all very well if we could assume that the physicians and surgeons would always be as well qualified as those who now hold office. But the University has no control over the appointments to the Infirmary, and might be landed with an entirely unsuitable person.

While maintaining that this is very unlikely, we are bound to concede that there is ground for the objection, and means must be taken to meet it. The difficulty is not confined to Edinburgh: Glasgow has faced and partly, at least, solved it; it confronts all the new universities, and it occupies a very prominent place among the many criticisms on medical education in the United States found in the Report of the Carnegie Foundation.

The Edinburgh Post-
Graduate Course.

EDINBURGH enjoys exceptional advantages for post-graduate study, for the Infirmary, the laboratories and other teaching premises, are conveniently centralised, and there is a large available teaching staff. During the University Session the clinical material, it is true, is required for the student, while the time and energy of many of the lecturers is fully occupied in undergraduate teaching. The facilities of the school are now, however, thanks to the University authorities and the Managers of the Royal Infirmary, at the disposal of the graduate during the summer vacation, and experience has shown there is no lack of lecturers willing at this time to take part in post-graduate teaching, the arrangements for which are entrusted to a committee composed of representatives of the University and Education Committee of the Royal Colleges.

The termination of the fifth successive annual course is an opportune time for reporting progress. The first of the series, a course of three weeks' duration, was held in the autumn of 1906. The following September the course was extended to four weeks, divisible into two independent fortnights. A four weeks' course in surgery, the attendance limited to twenty-five, was held in 1908 simultaneously with the general course, and the committee consented to advertise a series of independent classes on Methods of Diagnosis during the last fortnight of August. The arrangements for September 1909 were very similar, but the August lecturers determined to extend their classes throughout the whole of that month. This year the general and surgical courses were run on the same lines as in the past. The Executive Committee,

however, took over the management of the August classes, and by adding to these two hours of clinical instruction daily instituted a course on Internal Medicine, with an attendance limited to twenty-five.

The September courses in 1910 have, it would appear, been at least as successful as in previous years, while the August course is admitted to have given complete satisfaction. The attendance during September was practically the same as in 1909. The full number of entries for the surgical course having been received nearly two months before its commencement, while some sixty entered for the general course and twenty-three for that on Internal Medicine during August. There has thus, it will be seen, been a gradual development in the scope of the course from year to year, and the attendance has been increasing.

Appointments.

DR. R. BARCLAY NESS has been appointed a full Physician to the Western Infirmary, Glasgow, and Dr. Robert Kennedy a full Surgeon. Dr. Henry Carré has been appointed Medical Superintendent of the Glasgow District Asylum Woodilee, Lenzie, and Dr. F. M. Milne, Assistant Physician to the Dundee Royal Infirmary.

THE RELIEF OF CARDIAC ENLARGEMENT BY SURGICAL MEASURES.

By G. A. GIBSON, M.D., LL.D.

WHEN any therapeutic method is in its infancy, every instance in which it has been adopted is of value as an aid in attempting to form an estimate of the practical utility of the procedure employed. The chief aim of the present contribution is accordingly to relate the facts regarding a patient for whom the assistance of surgery was invoked for the relief of some urgent cardiac symptoms. But, as the patient presented considerable difficulties in diagnosis in consequence of a suspicion that there might be adherent pericardium, the case is of interest in its bearing upon the determination of one of the clinical conditions most troublesome to recognise.

A joiner, aged 37, born at Ayr, and residing in Leith, was sent by Dr. D. R. Murray to my ward on 13th October 1908, complaining of shortness of breath and feelings of oppression, as well as swelling of the ankles after exertion. He stated that his father was in good health, and that his mother had died, seven years before his admission, of heart disease; he had six brothers and two sisters, who were all in good health. He had always had good food, and had been a temperate man, drinking beer rather than whisky, but not more than one pint a day. He had not been exposed to weather in his occupation, his particular duty being to fit up the cabins of yachts. His home surroundings had always been quite satisfactory.

He fractured his left thigh when 19 years old, and had suffered from an inflammatory affection of the lower end of his right tibia two years before admission. He had been ill with a slight rheumatic fever about sixteen years before, and had been troubled with dull pains in many of his joints at intervals since that time.

He stated that, since the rheumatic fever, he had been short of breath. This had occasionally become more aggravated. His feet had been swollen at night; this was first noticed after the affection of his leg.

The patient was found to be a well-nourished man, 5 ft. 7½ in. in height, and 9 st. 8¾ lb. in weight. There was no anæmia, cyanosis, or dropsy. A pigmented scar was seen over the lower

end of the right tibia where the bone had been diseased. The left leg was slightly shorter than the right. The great trochanter of the left femur was much more prominent than that of the right. The patient's expression was cheerful, and he was able to lie in any position in bed. He felt no pain in his chest, but suffered from slight palpitation when excited. There was no faintness, but the patient became very short of breath on exertion.

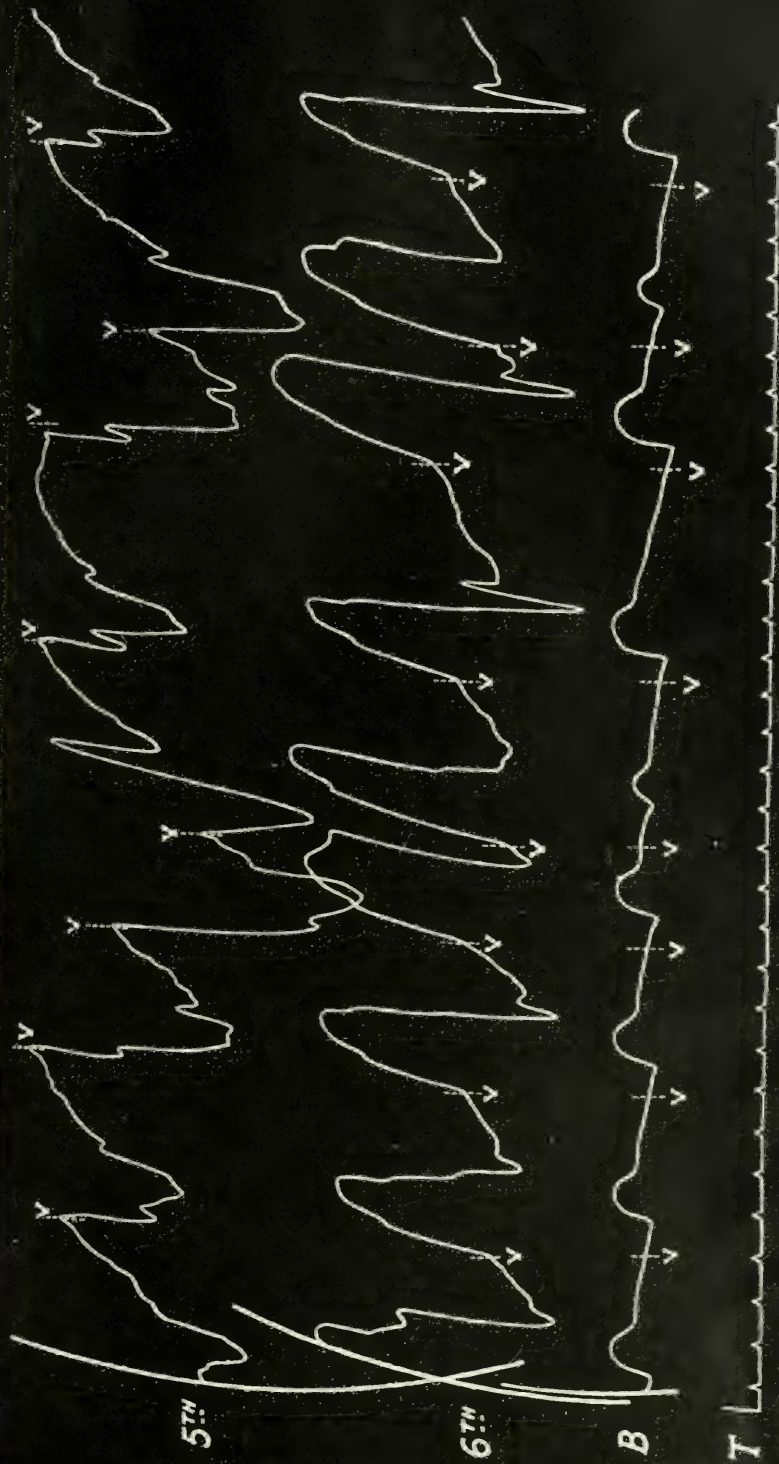
The arteries had healthy walls in every accessible position. Palpation did not seem to indicate any considerable increase of pressure, yet it was found on examination with the sphygmomanometer to reach 180 mm. Hg. as its maximum. The pulse-rate was moderate, being on an average about 70 per minute; it was very irregular, but each individual pulsation showed no characteristic departure from the usual characters.

The præcordia were well formed. There was no marked bulging; the 5th and 6th intercostal spaces, however, moved with each beat of the heart. An area in the 5th interspace was drawn in at each systole. There was slight epigastric pulsation, and pulsation also on the right side of the neck, which followed the apex beat. The cardiac impulse was well marked and diffuse, the maximum intensity being felt at a point in the 6th intercostal space 6 inches from the middle of the sternum. The apex beat was irregular in rhythm, and heaving in character; the impulse was well sustained. The upper border of the heart was at the level of the upper border of the third rib. The right margin of the heart was $1\frac{1}{4}$ inches to the right, and the left $6\frac{1}{2}$ to the left of the midsternum.

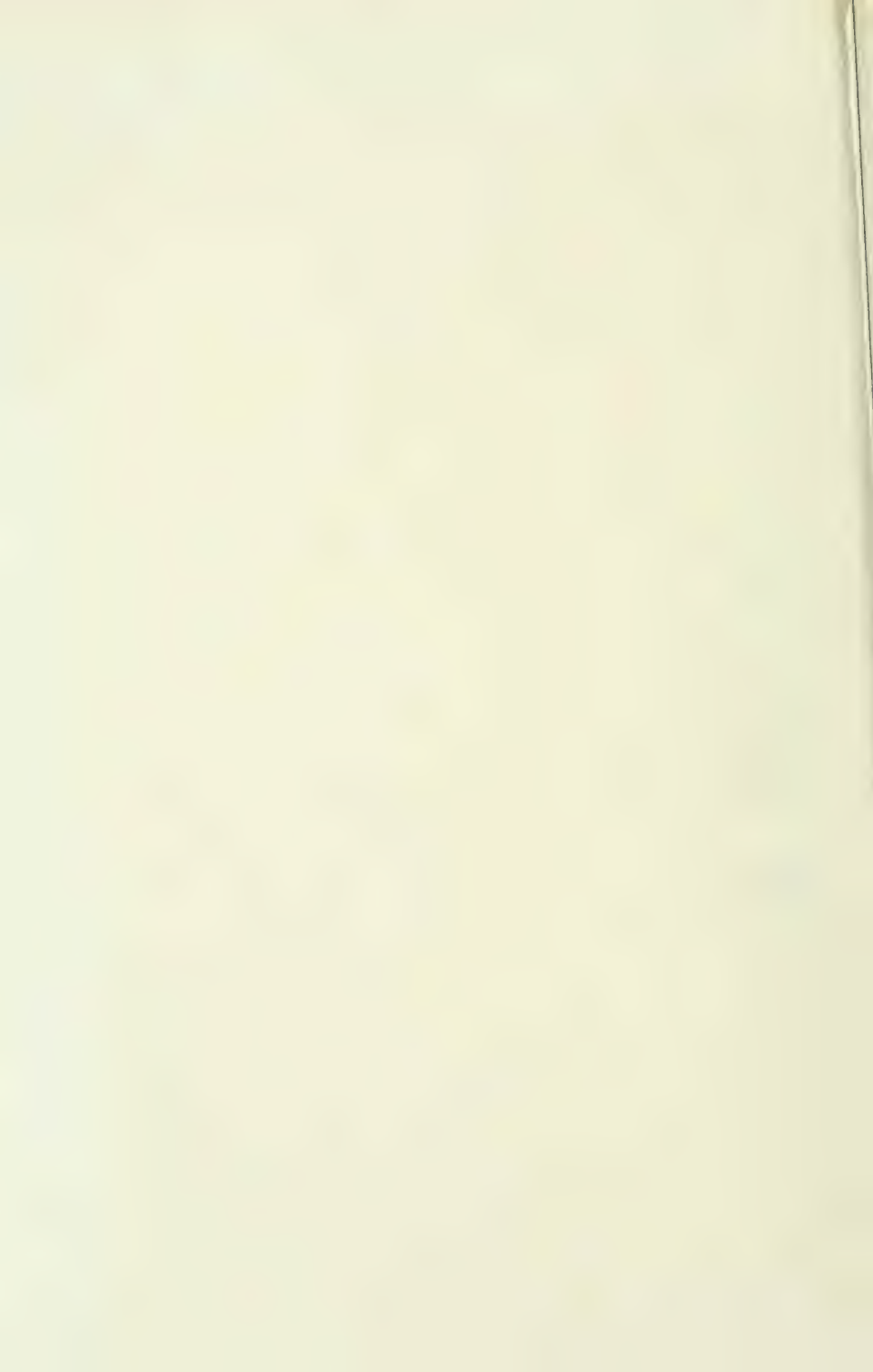
The apex of the heart was singularly fixed. On moving the patient to either side the position of the impulse was absolutely immovable. The left half of the epigastrium was drawn in during systole, and the 4th and 5th intercostal spaces were also retracted during this phase. There was, however, no indrawing of the interspaces to the left of the apex, and there also was no retraction of any of the posterior interspaces.

There were presystolic and systolic murmurs heard most distinctly in the mitral area, and both propagated chiefly towards the axilla. There was a systolic tricuspid murmur, and the second sound was accentuated in the pulmonary area.

A tracing, taken by Dr. W. T. Ritchie, my Clinical Tutor, shows the pulsation of the brachial artery, of the apex, and of the 5th intercostal space. It will be observed that while the apex beat has a well-marked positive wave, there is a distinct recession of the 5th intercostal space.



D.B. aet. 37 - 27 Oct. 1908



The lymphatic glands were not enlarged in any region, and the thyroid gland and spleen were normal. The blood gave the following appearances :—

Hæmoglobin	85 per cent.
Erythrocytes	5,420,000
Leucocytes	7,000

The differential count gave :—

Polymorphonuclears	65 per cent.
Small lymphocytes	25 „
Large „	4 „
Eosinophiles	6 „

The patient suffered much from shortness of breath, which was exaggerated on exertion. There was considerable cough, which was worst during the night and in the morning, accompanied by a pigmented viscid sputum. The respirations were 20 per minute, with a regular rhythm. There was no inspiratory retraction of intercostal spaces. The voice was clear and natural.

The chest was well formed, and moved slightly with respiration. It measured 36½ inches on expiration, and 37 inches on inspiration. The vocal fremitus was equal on both sides. There was no change from the normal on percussion or auscultation.

The urine was scanty, but contained no abnormal constituents.

The patient obviously suffered from obstruction and regurgitation at the mitral orifice, with cardiac hypertrophy and dilatation, leading to tricuspid incompetence; but in addition to these conclusions a further question, and one of much greater difficulty, arose from the indrawing of the epigastrium and 4th and 5th intercostal spaces during the cardiac systole. The suspicion naturally arose that the patient might have developed adhesions between the parietal and visceral layers of the pericardium at the time when he suffered from endocarditis. This suspicion was somewhat strengthened by the remarkable fixity of the apex beat. There was, however, nothing like the diastolic rebound so characteristic of adherent pericardium, and there were no appearances of any changes in the veins of the neck, such as are sometimes seen in that condition. The whole facts were discussed in a clinical lecture delivered on 27th November 1908, in which the possibility of adherent pericardium was fully considered, but was left an open question.

As the patient was suffering very considerably from cardiac uneasiness and cyanosis, the practical question of treatment became urgent, and although his condition was not promising, it was determined that the operation of cardiolysis afforded him the best prospect of relief from his symptoms. Mr. Caird, who saw the patient with me, entirely concurred in my views; the position of matters was fully placed before the patient, and as he grasped at any prospect of relief, he was transferred, on 1st November, to the care of Mr. Caird. A few days afterwards, while the patient was under the influence of ether, administered by the open method, Mr. Caird made a crescentic incision in the left half of the chest, and removed a few inches of the 4th and 5th ribs. Neither the pleura nor the pericardium was interfered with, and after the removal of the ribs the soft tissues were replaced, and the wound in the skin stitched up. The patient's progress was uneventful, and about a week after the operation he described himself as feeling very much better. The breathlessness in particular had become less troublesome, and he looked better in every way.

This improvement, unfortunately, did not last long, and the cyanosis again became more marked, while cedema showed itself in the lower extremities. As the wound had been long healed, and the patient required no further surgical assistance, he was readmitted to my ward on 25th November, when it was found that the cedema had reached as far as the middle of the thighs. The pulse was extremely irregular: the condition of the heart was very much as it had been when he was in the ward before, and there was no enlargement either of liver or of spleen. There was, further, no ascites. Some improvement resulted after a few days, but this was followed by a relapse accompanied by noisy delirium, for which he had to be transferred to the ward for acute nervous affections. Here he unfortunately developed erysipelas of the face, which speedily brought about a fatal termination.

A post-mortem examination was performed by Dr. Shennan on 30th November. It revealed the presence of old-standing mitral obstruction, with incompetence of the valves, and dilatation of the tricuspid orifice, also attended by valvular incompetence. There was no trace of any pericardial adhesion: the pericardium, in fact, was absolutely healthy. The interesting point revealed was the existence of very strong extra-pericardial adhesions, fixing the parietal pericardium to the sternum, costal cartilages, and ribs much more firmly than is commonly seen. The lungs

showed chronic venous stasis, while the liver, spleen, and kidneys also showed venous congestion.

The facts which have been described are of no value in attempting to form an estimate of the benefits to be derived from operation in more favourable cases; as has, however, been already remarked, every instance, whether satisfactory or otherwise, ought to be narrated in the case of new methods. Some further experiences of mine in this direction will shortly be published.

An attempt to relieve a labouring heart by thoracostomy was originally suggested, as far as consists with my knowledge, by Morison¹ in 1897. It was first carried out, however, for Brauer² by Petersen and Simon. Since the date of the three operations described by Brauer, Wenckebach³ has published details of a case performed by Koch, and this was followed by one carried out for Morison⁴ by Stabli. It is too soon yet to discuss the results of these operations, but in some of the cases great relief followed the procedure adopted.

From the point of view of diagnosis, it is interesting to observe that there may be absolute fixation of the heart without adherent pericardium in the ordinary sense of adhesions between the epicardium and pericardium. The extra-pericardial adhesions present in this case must certainly be somewhat uncommon, except in association with pleural adhesions, and, as nothing of the kind was present, it is impossible to account for the origin of the strong fibrous connections. The indrawing during systole of the epigastrium, and of the region above and around the apex, but not of the apex itself, was suspicious but not pathognomonic of adherent pericardium: and the absence of any diastolic rebound, as well as of any diastolic collapse of the veins, prevented the positive diagnosis of such a condition.

REFERENCES.—¹ *On Cardiac Failure and its Treatment*, London, 1897, p. 89.
² *Archiv. für klin. Chir.*, 1903, Bd. lxxi. S. 258; *Verhandl. der deutsch. Gesellsch. für Chir.*, 1903, Bd. xxxii. S. 133; *Verhandl. des XXI. Congresses für innere Medizin*, 1904, S. 187. ³ *Brit. Med. Journ.*, 1907, vol. i. p. 63. ⁴ *Lancet*, 1908, vol. ii. p. 7.

GONOCOCCIC ARTHRITIS AND ITS TREATMENT.

By WILLIAM MURRELL, M.D., F.R.C.P.,

Physician to the Westminster Hospital ; Lecturer on Medicine and Clinical Medicine ; late Examiner in the Universities of Edinburgh, Glasgow, and Aberdeen.

THE credit of first describing gonorrhœal rheumatism is ascribed to Sir Astley Cooper and to Sir Benjamin Brodie. Brodie, in his *Diseases of the Joints*, 5th ed., 1850, says: "The disease is usually described under the name of gonorrhœal rheumatism, though it is plain from the course of its symptoms and from the effects of remedies that it differs from rheumatism in many important respects." He adds: "Cases of this kind are not very uncommon, and are now well known to every practical surgeon, though it is a remarkable circumstance that no account of them should have been given (as far as I know) by any pathologist or surgical writer previously to the first edition of the present treatise in the year 1818." Brodhurst gave a good description of the disease in Reynold's *System of Medicine*, vol. i. 1866. In December 1871, T. Nunn, of the Middlesex Hospital, published a lecture on the subject, and in March of the following year a paper appeared by T. Bond of the Westminster Hospital. It, however, was not until after the discovery of the gonococcus in 1879 that the matter was put on a satisfactory basis.

The terms "gonorrhœal rheumatism" and "gonococcic arthritis" are not absolutely synonymous, and it would be well if the former were applied only to those cases in which the fasciæ and fibrous structures were involved, leaving the latter for those in which the joints and adjacent parts are alone implicated. They are both, however, symptoms of a general gonococci invasion, of which urethritis, iritis, scleritis, endocarditis, salpingitis, pleurisy, neuritis, and acute myelitis are other component factors. It is a disease of the septicæmic type, and the gonococci are being constantly conveyed to different parts of the body through the agency of the blood and the lymph channels, exciting secondary local manifestations not only in the joints but elsewhere.

The micrococcus gonococcus described by Neisser is usually regarded as the specific cause of the disease, but is often contaminated with other organisms, of which the staphylococcus pyogenes aureus and the diplococcus urethrae communis of Foulerton are the most common.

The site of inoculation in men is usually the urethra, but the gonococcus, under favourable circumstances, produces its specific effects by whatever channel it makes its entrance into the body, and gonococcic infection does not of necessity involve a preceding urethritis. The first attack may or may not be preceded by a specific gonorrhœal discharge, but when such is the case, subsequent attacks may follow a urethritis in which gonococci are absent or are not readily detected, and still later there may be attacks without any urethral discharge. When the patient first comes under observation for arthritis there is usually no remaining urethritis, but, on squeezing, a drop of transparent, gleet-like fluid may be obtained. In the case of women, the common site of inoculation is the vagina and os uteri. Swabs in women, even in recent cases, often show nothing characteristic, although there may be cocci of all kinds and many varieties of bacteria.

Conjunctival infection occurs both in children and adults. In a case of conjunctival arthritis under my care, the patient, a night porter at a London hotel, was positive that he had not suffered from any preceding urethritis, and squeezing the urethra gave a negative result. He had evidently acquired the infection by rubbing his eye with a contaminated finger. He had a severe attack of arthritis, involving the right wrist and left knee, and was in hospital for nearly two months.

There is an impression, a kind of article of faith, that gonococcic arthritis occurs almost exclusively in men. Nunn, for example, says: "Women never, or with very rare exception, suffer from gonorrhœal rheumatism." This is certainly not the case, and of late the women sufferers have been in the majority. During the last two years this form of arthritis has been very prevalent in maid-servants. It is not easy to find an explanation, but it is probably not unconnected with the motor industry. Some girls find it difficult to resist an invitation to go for a drive in a well-equipped car.

The interval which elapses between a gonorrhœal infection and the onset of the arthritic manifestations varies much in different cases. It may be only a few days after the first appearance of the discharge, or it may be delayed for some weeks. Fournier says it occurs most frequently between the sixth and the fifteenth day, whilst Gosselin puts it at fifteen to twenty days. Brodhurst mentions from ten days to three weeks as the usual interval, and says that the onset may be determined by cold, such as sitting in a draught or in wet clothes. In a

recorded case the knee was affected a week after the appearance of the discharge. In one of Brodie's cases the patient, a man of 45, contracted gonorrhœa in the middle of June; on the 23rd he first experienced pain in the feet, whilst on the 27th there was fluid in the left knee. He was completely crippled, compelled to keep his bed, and scarcely able to vary his position in the smallest degree without assistance. In most of my cases in young women the joint affection appeared three weeks after the commencement of the discharge, but in one instance there was an interval of six weeks.

It is difficult to say what proportion of cases of specific urethritis are followed by arthritis. Rollet puts it at 4 per cent., and Bond at 10 per cent. These figures are obviously far too high if we take into consideration the comparative infrequency of gonococcic arthritis even in hospital practice, and the enormous prevalence of gonorrhœa. A great number of cases of the latter complaint, when unattended with complications, do not come under the care of a medical man, the patient contenting himself by going to a chemist for a bottle of lotion and a box of capsules.

In gonococcic arthritis the onset is not sudden, and is rarely ushered in by a rigor. There is little elevation of temperature, and when hectic in character it is an indication that there is a mixed infection. In uncomplicated cases there are the usual indications of constitutional disturbance, such as headache, furred tongue, loss of appetite, constipation, and pains in the limbs, but they are transitory and never severe. The patients usually first complain of rheumatism in the knees from cold, or say that they have tender feet from overwalking. Pain in the heel is another common source of discomfort, and is probably due to inflammation of the osteo-fibrous attachments to the calcaneum and implication of the internal plantar nerve. A combination of dull pain in the heels and ankles, with congestion of the sclerotic and effusion into one or more joints, is suggestive of a gonococcic origin. Gonococcic arthritis is at the onset nearly always poliarticular, although ultimately the inflammation may be confined to some particular joint. For many years it was thought that gonococcic arthritis was confined to the knee, and the knee only. Senator, for example, says: "The inflammation is certainly situated in one knee joint." Statistics have been published showing the great preponderance of knee cases over those affecting the other joints. The explanation probably is that when the knee alone is involved it is thought

to be gonococcic, whilst when other joints are attacked a diagnosis of rheumatism is recorded. It is true that the knee frequently suffers, but that joint, from its exposed situation, and from the fact of its being imperfectly covered by other tissues, is liable to arthrites of all kinds. This proclivity is not characteristic of gonococcic infection, and is not more pronounced than in other diseases in which the joints are affected. The hip, wrist, elbow, shoulder, and hand are frequently involved. Certain joints not usually attacked by rheumatism may be implicated, notably the temporo-maxillary, the sacro-iliac, and the sterno-clavicular. In one of my cases the sterno-clavicular was the first joint attacked, the wrist and elbow following some days later. Metastasis is not common, and there is no tendency for the inflammation to shift from one joint to another—a point of diagnostic importance. The joint condition is not a true arthritis, for it is more commonly a synovitis, with effusion into the sheaths of the tendons. A dome-shaped swelling of the dorsum of the hand is said to be characteristic, but it is also met with in gout. Affections of the fasciæ are common, giving rise in the case of the plantar fasciæ to flat-foot, and in the lumbar region to a painful condition mistaken for lumbago. Fluid aspirated from the joints is usually sterile, and shows nothing of diagnostic value. The inflammation rarely goes on to suppuration unless there is a mixed infection. The selection of the joint attacked is usually determined by accidental circumstances. A man plays football a few weeks after contracting gonorrhœa, and the disease attacks the ankles. His friend, under similar circumstances, carries a parcel to oblige a lady, and gets it in his hand. A patient of mine had eight attacks of gonorrhœa without complications. A quiescent period of eight years then elapsed. In February he contracted another attack, which he hoped would run its usual benign course. In April he had the misfortune to fall into an excavation, some six feet deep, striking his back on the edge of the aperture. Two days later he took part in a golf tournament, and was seized with violent pains in the back, which laid him up for three months.

Gonococcic infection gives rise to no protection, and a patient may suffer from a succession of attacks extending over a long period of years. The successive repetition of the same symptoms under similar circumstances indicates their pathogenic connection. It is said that a proclivity to gonorrhœal rheumatism runs in certain families, there being a personal peculiarity or idiosyncrasy, but there is no proof of this, and I think it most unlikely.

The complications of gonococcic infection are many; a student of mine, who personally has had special experience in the subject, enumerates over forty. The most serious, from the social point of view, is salpingitis. There may be a preceding condition of endometritis, and then, after a short interval, the inflammation of the tubes is ushered in with a rigor and considerable elevation of temperature. There is tenderness in both groins, and the patient is told that she must rest in bed. The acute symptoms gradually subside, but menstruation becomes more frequent and more painful, and there is much discomfort in the intervals. After a time there are other attacks, and the appendages are involved to their fullest extent. The girl suffers in general health; she is anæmic, listless, and destitute of energy: she has chronic leucorrhœa, obstinate constipation, and constant irritability of the bladder. Little by little it is brought home to her that theirs must be a childless marriage; someone further enlightens her, and her affections are alienated from her husband. She is doomed to lead a gynecological life, and suffers much in the way of operations and other forms of treatment. A large proportion of cases of sterility, and especially of one-child sterility, are due to gonorrhœa. The woman may suffer from many of the general symptoms met with in "larval syphilis."

Of the eye symptoms, apart from the purulent ophthalmia caused by direct inoculation of the conjunctiva with gonorrhœal pus, iritis and scleritis are amongst the common. Some people seem to doubt the existence of a gonococcic iritis, but it rests on as firm a basis as the syphilitic variety. It rarely follows directly on a gonococcic urethritis, there being almost invariably an intervening attack of arthritis. Injection of the sclerotic is a frequent accompaniment of gonococcic arthritis, and the combination is of diagnostic importance.

Many people are apparently still under the impression that one of the most striking differences between gonorrhœa and true rheumatism is the practical immunity of the endocardium in the former disease. This is an entire mistake, for valvulitis may be gonococcic in origin, and the endocarditis may set in as early as the first week of the urethritis. Moreover, old-standing cardiac lesions are often intensified and aggravated by this condition. Arteritis is another serious complication, and atheroma of the aorta has been traced to this cause.

Gonococcic neuritis is by no means uncommon, and usually assumes the form of sciatic neuritis. When in hospital practice

the notes are taken of an obstinate case of so-called sciatica, it will usually be found that a careful inquiry has been made into the possibility of a syphilitic origin, but no mention is made of any preceding attack of gonorrhœa. The gonococcic form is not only severe, but may persist for a long series of years. The connection between the two conditions is commonly overlooked. A more extensive involvement of the nervous system is occasionally met with, and acute myelitis may be gonococcic in origin.

The connection of gonococcic infection with the invasion of tubercle is well known. In some cases of gonorrhœa the tubercle bacilli, as well as gonococci, have been detected in the discharge. This is probably the explanation of some cases of genito-urinary tuberculosis of the ascending variety. In men the testicle, epididymis, prostate, bladder, and kidney may all suffer. In much the same way joints which have undergone gonococcic inflammation may at a later stage become tuberculous.

A difficulty is often experienced in diagnosing between different forms of infective arthritis. If an arthritis follows a specific urethritis, the probabilities are that it is a gonococcic arthritis, and, similarly, if it follows an acute lobar pneumonia, it is probably pneumococcic. But often enough the preceding history affords us little guidance: for example, a man with gleet gets an attack of influenza, followed by pneumonia. In this particular instance the diagnosis is made on other grounds, for a pneumococcic effusion into the joints usually becomes purulent, whilst this is rarely the case in the gonococcic form. In some varieties of arthritis, the rheumatoid for example, although there is much pain there is little effusion. Even when there is considerable effusion the fluid obtained by aspiration may be sterile, showing no micro-organisms in the films and no growth on cultivation. A more annoying condition is when many different organisms are found but nothing characteristic. Individual cases often present difficulties in the matter of diagnosis. For example, a middle-aged plethoric man presents himself with a dome-shaped swelling on the dorsum of one hand, attended by the usual signs of inflammation and some fever. The question is whether it is gout or a gonococcic arthritis. There is probably no history, or none on which any reliance can be placed. Even if there is a discharge, it is probably said to be a gouty urethritis. A bacteriological examination may throw some light on the subject, but often there is nothing to examine. It is conceivable that the man may have an acute attack of gout with a superadded gonococcic arthritis.

Another class of case is where a young girl marries a man whose past history has been somewhat complex. Soon after marriage she develops an arthritis of one wrist, which is held to be tuberculous. The husband is perfectly frank, and says that in his younger days he had many attacks of gonorrhœa, of which he believed himself to have been perfectly cured, although, perhaps, some very slight trace of a gleet may have persisted. It is obviously a matter of considerable moment to clear up the diagnosis and to determine whether the joint is gonococcic or tuberculous. I do not think it would be justifiable to subject the patient to Calmette's test and a possible injury to the eye, and Moro's reaction is unreliable, but a von Pirquet is a simple matter, and speedily solves the difficulty. Probably, in a case such as this, many opinions will have been obtained which have not always been in accord, so that it is well to remember that although the arthritis may be gonococcic at first, there may subsequently be added a tuberculous infection.

Marshall points out that gonococci which have lain dormant in the male urethra may become active when transplanted to a virgin vagina, and may reinfect the male urethra from which they originated. In this way a man may be reinfectd with his own gonococci by rejuvenating them on a virgin vagina. A husband who has considered himself cured of his old gonorrhœa before marriage may thus blame his wife for his misfortunes, whereas he has reinfectd himself and probably infected her.

The question is sometimes raised as to the diagnosis between gonorrhœal rheumatism and what is known as muscular rheumatism. Apart from other considerations, it is well to remember that in the gonococcic variety the plantar fasciæ are commonly involved, and the patient complains of pain in the heel. The erector spinae muscles may be attacked, and there may be pain referred to the region of the diaphragm—conditions not met with in the muscular form in which the fasciæ of the neck more often suffer. The occurrence of sterno-clavicular arthritis would at once determine the question in favour of the gonococcic form.

The subject of prognosis is one of much importance, and involves a consideration of two factors—the duration of the arthritis condition, and the likelihood of the formation of fibrous adhesions. In hospital practice the arthritis rarely subsides under three or four weeks, and often lasts a couple of months or more. It runs pretty much the course of the acute rheumatism cases

seen in the pre-salicylate days. Fibrous adhesions often occur in and around the affected joints even during the acute stage, and much care is required to prevent permanent ankylosis. Brodhurst reports the case of a man who in five years, and as the result of a succession of attacks of gonorrhœa, became ankylosed in almost every joint in the body, so that the vertebrae, the hips, knees, ankles, shoulders, elbows, wrists, and jaw were so firmly fixed that no movement in them could be obtained. I remember the case of a man in the Guards who had a gonorrhœa for which, presumably, he was efficiently treated. Soon after he inherited a large property in the north of England, and got married. Extensive adhesions formed about his joints, and he was unable to live on his estate. He went first to the south of France and then to South Africa, and for the last twenty years has been an absentee landlord. It is a fair ground for speculation if, supposing the son of that man had had a similar experience, modern treatment would have proved of such avail as to obviate the necessity of leading the life of an exile.

That the modern treatment of gonorrhœal rheumatism has been greatly improved must be conceded. In the old days the measures in common use were Dover's powder, iodide of potassium and guaiacum with mercurial inunctions, leeches, blistering, and baths of all kinds; but although possibly of some value, these remedies have now fallen into disrepute and are rarely used. A surgeon recently lecturing on the subject said that he always treated the urethritis and left the rheumatism to look after itself; this pronouncement displays a curious want of grasp of the subject, for in many cases there is no urethritis to be treated.

In the past I have treated a considerable number of cases of gonococcic arthritis with an antigonococcic serum. I have usually given a series of 25 c.c. spread over a period of twenty-four hours; for example, 10 c.c. at 10 A.M., 5 c.c. in the evening, and 10 c.c. the following morning. In some cases, although not in all, there has been a reaction indicated by a rise in temperature of a couple of degrees, with slight constitutional disturbance and increased pains in the joints. Sometimes there has been a serum rash, usually an erythema or an urticaria, but it has been transitory, and has given rise to no inconvenience. In a case of general gonococcic invasion in which there was acute iritis in both eyes with general arthritis a series of six injections, eighteen in all, produced no beneficial effect. Thinking that there might be a

mixed infection, a polyvalent antistreptococcic serum was substituted, and on this the iritis rapidly cleared up. In another case undoubtedly gonococcic the polyvalent serum failed to effect any improvement, whilst six injections of antigonococcic serum were followed by an early diminution in the size of the joints. In still another case in a child with much swelling of the shoulder and puffiness of the dorsum of one hand, in whom diplococci morphologically and tinctorially undistinguishable from gonococci were obtained from the vagina, injections of antigenococcic serum were followed by an immediate improvement.

My general impression was that the serum was useful, as there were many cases of apparent success, but subsequently I met with a still larger number of cases in which it was a distinct failure. I have been compelled to modify my original favourable opinion, and have now reluctantly come to the conclusion that an antigonococcic serum is of little or no therapeutical value. This is borne out by theoretical considerations. Antigonococcic serum is usually prepared by injecting the virus into horses, but here a difficulty arises, for the gonococcus is a strictly human parasite, and is non-pathogenic in animals. From inquiries I have made I find that horses do not suffer from gonorrhœa or any form of gonococcic invasion. In the last edition of Frieberger and Fröhner's *Veterinary Pathology*, and in other recent works on the subject, I find no reference to gonococcic infection in animals. It is clear that the horse is not obviously susceptible to gonococcic infection. This may arise from many causes, such as the presence of natural antibodies destructive of the organism against which the animal is immune, but the fact remains. Recently, in order to meet these objections, an attempt has been made to prepare the serum from monkeys, but these animals, tested with the gonococci, give only negative results.

The most recent treatment is by gonococcic vaccine, but here a distinction must be made. If an auto-vaccine can be prepared either from the urethra or from the fluid drawn from the joints, the results are distinctly good, but in many cases these sources are not available. We have then to fall back on a stock or hetero-vaccine prepared from the gonorrhœa of another patient. The question of dosage is an important factor. At first doses of from five to ten millions were given and were not efficacious. Recently I have given larger doses and have obtained better results. Eyre and Stewart, who have had considerable experience in the use of these vaccines, have treated cases of acute and chronic gonorrhœa,

orchitis, epididymitis, iritis, and arthritis, using a polyvalent vaccine composed of equal numbers of gonococci from three different sources, a polyvalent vaccine composed of ten strains, and also autogenous vaccines. Considerable variation in dosage was tried, ranging from five to ten millions, but doses of from one to two millions were found efficacious. Small doses at short intervals answered better than large doses at long intervals. Valuable as are stock vaccines, autogenous vaccines are superior. In acute gonorrhœa vaccine treatment is not devoid of danger, and requires caution. In chronic gonorrhœa, where there is usually a mixed infection, they find the most satisfactory results are obtained when the gonococcus is the sole infecting organism. In gonococcic iritis the symptoms are relieved in from three to four days, a result which is satisfactory, having regard to the obstinate nature of these cases. In the arthritic form the symptoms are said to have cleared up in from thirty-six to forty-eight hours, the pain and tenderness passing off and leaving greater movement in the joints.

Although my cases of gonococcic arthritis treated with vaccines have been less striking, the results have been distinctly good. The following are examples:—

A parlour-maid, æt. 19, was admitted with acute inflammation of the left sterno-clavicular articulation, followed on the following day by inflammation and œdema of the tissues adjacent to the right wrist and two days later by a similar condition of the left knee. She had had an acute vaginal discharge for three weeks or a month. Vaginal swabs taken at intervals showed nothing characteristic, although there were cocci of various kinds. The fluid aspirated from the knee and wrist was sterile, no organisms being found in the films or cultures. Pus from the sterno-clavicular articulation showed only a few colonies of Gram-negative cocci, not sufficient for the preparation of a vaccine. A course of anti-gonococcic serum was given, but effected no improvement. A stock antigonococcic vaccine was then substituted, and was given in the following doses:—On 28th May and 3rd June, 5 millions; on the 9th, 12½ millions; on the 16th, 25 millions; on the 23rd, 50 millions; on the 30th, 100 millions; and on 10th July, 200 millions. The injections produced no reaction, but the temperature early in the vaccine treatment fell to normal, and the inflammation in the joints gradually subsided. She was under treatment for nine weeks and two days.

A nursemaid, æt. 16, as the result of a motor drive in the

country, contracted a profuse greenish vaginal discharge, attended with much scalding, and followed three weeks later by acute arthritis of the left wrist and elbow. On two occasions vaginal and cervical swabs were taken. There were numerous bacteria, and some Gram-positive and Gram-negative cocci were found, but as the last were extra-cellular, they were held not to be gonococci. The fluid from the joints was also examined and showed nothing characteristic. The patient was given a stock antigonococcic vaccine in doses gradually increasing from five to twenty millions. At the end of six weeks the condition of the joints had much improved, although fibrous adhesions had formed about both the elbow and wrist, and had to be kept in check by daily passive movements.

A married woman, æt. 33, not living with her husband, developed inflammation of the left wrist, followed two days later by implication of both knees and the left ankle. The appearances were consistent with gonococcic infection. On admission the temperature was 101° , and the structures surrounding the left wrist were acutely inflamed. A vaginal swab gave no indication of gonococci, and fluid from the wrist on two occasions showed only streptococci. Injection of a stock gonococcic vaccine in doses ranging from five to ten millions produced amelioration of the symptoms, but ankylosis of the joint supervened.

It may be urged that there was no bacteriological evidence that these cases were gonococcic in origin. This illustrates the fact that even in experienced hands gonococci are not readily detected in the fluid drawn from the joints, even when the clinical symptoms make the diagnosis certain. One of the great dangers attending the gonococcic arthritis cases is the occurrence of fibrous ankylosis, leaving the patient with a permanently damaged joint. This is often the result of the injudicious use of a splint. Passive movement in these cases is essential, but I have seen benefit from local injections of fibrolysin and of tiodine.

A WORKING PLAN OF CLINICAL MEDICINE TEACHING.

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AT the present juncture it may be helpful to give an outline of the scheme of clinical instruction which is in working order in the wards of the Edinburgh Royal Infirmary set apart for the education of women students of medicine. The physician in charge of these wards is in the unique position of being solely and wholly responsible for the education of women in clinical medicine, as women are not admitted to any of the other medical wards. He has to introduce them to their clinical medicine studies, and he has to carry through and complete their instruction in this department. The responsibility, being thus undivided, is correspondingly great. The responsibility, however, carries with it the compensation of watching and noting the development of the students' knowledge, intelligence, and skill. Further, it enables him to graduate the instruction in accordance with the stage to which the groups of students have attained. Indeed, the suitable use and application of this principle will be found to be the key to the solution of the problems which the teaching of clinical medicine in Edinburgh presents at the present time.

I do not propose to discuss the questions which could be raised as to the causes which have led to the dissatisfaction which, it must be granted, exists as to the present state of matters in this department. How much is to be attributed to faulty methods in the earlier stages of the student's medical education, how much to changes in the mental attitude of the more recent generations of students, or how much to changes in the teaching and the teachers, I do not venture to discuss. It may, however, be safely postulated that, if the results of an educational system are unsatisfactory, the faults are not usually one-sided, and the present problem is probably not an exception to this general rule.

THE STUDENT BEGINNING CLINICAL MEDICINE.

I may begin the account of the method followed in my wards by taking up, in the first place, the students beginning the study of clinical medicine.

Until a year ago the women students began the study of clinical medicine in the summer after their third winter. By this time they ought to have passed their examinations in Anatomy and Physiology, and to have had a course of lectures on Pathology. They have also been introduced, through Surgery, to the study of diseased processes in the living body. Last year, owing to changes in the curriculum, this summer (the summer after the third winter) was given to clinical surgery from eleven o'clock onwards. It seemed almost hopeless to get the students for clinical medicine also, and yet I was satisfied that the advantages of beginning clinical medicine then were very great. I was glad, therefore, to find on inquiry that they were willing and anxious to come to me either at nine or at ten o'clock. In the summer of 1909 the hour was ten, in 1910 it was nine. The class was held in the clinical room, *i.e.* the *convalescent room*, and it was arranged beforehand what patient should be used for instruction.¹ The instruction given to the class was most elementary: normal movements of chest and abdomen were noted, and were used as the basis of comparison with other chests; the percussion sound over lung was compared with that over heart and liver; and the auscultatory sounds to be heard over normal lungs and heart, and the area of chest over which these were heard, were studied. From these first steps we passed to abnormal phenomena to be found by inspection, palpation, percussion, and auscultation. In the nervous system we took up the examination of simple phenomena—voluntary motion, motor power, sensibility, co-ordination, reflexes. In the abdomen we took up inspection, palpation, percussion, as these could be applied in individual cases. All these observations the individual student was taught to make, and then to make for herself; instruction was conducted by means of questions, and all the students were stimulated to think of all questions as addressed to them personally and to be thinking of the answers to them. In the earlier weeks we only made observations—the students learning to see, to percuss, to auscultate, and to palpate, without any explanation going beyond simple explanation of phenomena, or any question as to the morbid changes which might give rise to the phenomena. In the auscultation of the respiratory system we began with the sounds heard over the trachea, always separating inspiration from expiration, estimating the length of audible expiration as compared with inspiration, and the character of

¹ This class never met in the wards.

the sound during both inspiration and expiration. From the trachea we passed to the respiratory sounds heard over the lungs, and, as we made these observations in all the patients examined, the students rapidly acquired a measure of confidence, in judging of breath sounds, that was highly satisfactory. The abnormal, either in character of breathing or from the presence of accompaniments, was easily added to this. In the same way the auscultation of the heart was taken up and studied, so that by the end of the session the students had acquired great facility in determining the loudness of heart sounds, in determining whether murmur was present or not, and also in judging of the time and seat of production of murmurs. Other physical phenomena were dealt with in the same way. Our main object was to lead the students to see, to hear, to use their hands properly, and to acquire confidence in their own senses. The hour was occupied by the students *doing* these things, and interest could always be maintained or intensified by a difference of observation on the part of the members of the class as to the description of a breathing, or the presence of a murmur, or the area of its greatest loudness. It is not necessary for the teacher to do more talking than is required to keep up interest in the points at issue. No part of the work interests the students so much as auscultation, and as it is perhaps the part more than any other of physical examination which requires most critical faculty, coupled with the experience of the examination of many chests, the students were required to have stethoscopes by the second or third day. My students study auscultation by means of the single stethoscope. The methods of examining the nervous system are also repeatedly gone over by examining individual cases of nervous disease; but these are infinitely more easily acquired than skill in percussion and auscultation. During this course of instruction I constantly warned the students to concentrate their attention wholly on phenomena appreciable to the three senses of sight, touch, and hearing, without any attempt to think of what the disease or disorder might be. Starting from a knowledge of normal phenomena, they soon acquired the power of noting in what respects the abnormal phenomena present in lungs, heart, &c., differed from the normal. This line of observation was constantly employed, and interest was daily maintained in it by showing that the class was divided as to the description of elementary observations.

This method, patiently and perseveringly followed, kept the

students' minds from the outset turned in the right direction, and it showed them that they had patiently to educate their own senses.

More than this, however, had to be done. To enable this summer course of instruction in clinical medicine to rank as a *qualifying* course, it was necessary to give the class two clinical lectures a week, that is, twenty lectures in the ten weeks or so of the summer term. These compulsory lecture hours took up two of the five hours available for this class every week, and they were utilised for explaining the phenomena the class had been observing. The pathology and morbid anatomy of the lung conditions which gave rise to abnormal signs were dwelt upon; so were heart conditions; so were gastric, hepatic, and abdominal conditions; so were brain and cord lesions. In all these I did not go beyond what their anatomical, physiological, and pathological studies ought to have enabled them to follow; for the clinical phenomena were correlated to these. These lectures were also used at other meetings for questioning the students as to the physical conditions giving rise to abnormal phenomena. Questions were asked when the sounds in a chest were being listened to by each one in rotation.

In this way the summer term was utilised, and no one who watched the evolution of the class would doubt the necessity for, and the great advantage of, such careful foundation-laying.

As this scheme had long appeared to me to be the most suitable for the student, and as the teaching of the junior student very specially requires the experienced teacher, hitherto I have taught this class myself. This arrangement had the very great advantage that, if all the students did not reach as high a standard as I thought they ought to—and all never did—I knew that it was not from a defect or a deficiency in the teaching; or, if blame were to be apportioned, it lay between the student and me, and not between the student and someone else. I also found whether the student was following my instruction, or trying to cram up statements and methods from other sources, some of which are deplorably inaccurate.

This junior class is not infrequently attended by senior students coming from other schools, or, for a second time, by students who had not as juniors given the subject the attention it required. In this class the first place is always given to the juniors, and all the teaching is directed to them. The seniors are not asked questions, and they examine the patients after the juniors have finished.

Seniors have been most grateful for being allowed to attend on these terms.

SENIORS IN THEIR FINAL SUMMER TERM.

During the summer term a large number of students are looking forward to the examination in clinical medicine in July, and are anxious to have clinical instruction suited to students at this stage. I have found that these students were anxious to come to the wards three days a week—usually Tuesday, Wednesday, and Friday—at noon. They had already attended clinical medicine much beyond the prescribed period, and when given the choice they selected clinics to clinical lectures.

Having already lectured to the juniors, I was free to fall in with their wishes, which in this matter was in accordance with my own judgment as to what would be most useful to them. These clinics were most interesting to the teacher, for there was no point presented by the cases that could be considered too minute to be noted, or unsuitable for asking questions about, and for expounding when necessary. The regular attendance, the attention and interest shown, proved how willing the student was to learn. These clinics were also attended by some of the students who were in the summer following their fourth winter, and who already had attended clinical medicine for a summer and a winter. Attention, however, was centred upon the final summer students. In fact, the summer after the fourth winter might, if my plan were generally adopted, be devoted to special subjects rather than to attendance in the general medical wards.

THE FOURTH WINTER STUDENTS.

In the fourth winter the students attend lectures on systematic medicine and also attend clinical medicine daily. During this winter the students ought to have no systematic classes after ten o'clock, and the wards are open to them from that hour until noon. From ten to twelve is therefore available for case-taking and for sideroom work in connection with their cases. Case-taking is begun this winter, and the fourth winter students are sometimes attached to a fifth winter student for instruction, or they are helped by the house physician. At noon a clinic is held three days a week, at which cases are read, examined, and discussed, on a level suitable to the stage to which the students have reached. Two days a week there is a clinical lecture on a case or group

of cases in the wards, or on some subject suggested by the cases. These lectures can be made suitable for the fifth winter as well as the fourth winter student, and I find that the fifth winter students attend them regularly.

THE FIFTH WINTER STUDENTS.

These students have already attended clinical medicine for a summer and a winter, and perhaps for a second summer, but they are encouraged to continue to give as many days a week to clinical medicine as possible. They usually come three days a week, but sometimes four days; two of the three or four days are clinical lecture days, and these they attend along with the fourth winter students as already stated. On the other one or two days they get a clinic to themselves—the fourth winter students meeting in the clinical room, while they meet in the ward, or *vice versa*. For clinics it is more pleasant for teacher and student for the years to be kept apart than taken together; only occasionally are they combined.

THE PLACE OF THE ASSISTANT PHYSICIAN.

When two clinics are held simultaneously, the assistant physician attached to the wards takes one—sometimes he takes the juniors, at other times the seniors. I have also often been relieved of a day's teaching by the ready courtesy of my assistant physician in taking the fourth winter students. As a rule, my assistant physician takes two clinics a week, while I take three. I take the clinical lectures on Tuesday and Friday with few exceptions.

TOTAL TIME FOR CLINICAL MEDICINE.

By the foregoing plan the students attend clinical medicine for two winters and for two or three summers. The seniors get certificates for the attendances they put in and for the number of cases they take. In all the classes attendance is taken daily.

THE CLINICAL FEES.

It is perhaps well to mention here that the fees for instruction in clinical medicine are the same as they were when the student had only one winter in the medical wards. A perpetual fee has the great advantage that the senior student is encouraged to attend without any monetary motive being attributable to the teacher.

A WANT.

I can hardly conclude without referring to what is to me a very serious gap in our clinical work. In my opinion *every student* ought to be systematically taught not only urine examination, but the examination of blood and sputum, along with other methods. For instruction in these there ought to be a room attached to the ward. An hour daily for the first term of the fourth winter could be used for this purpose, there should be a special fee for it, and it ought to be taught by a clinical tutor if the assistant physician did not want to do it. The fees would go to whoever taught the class.

GASTRO-JEJUNAL AND JEJUNAL ULCERATION
FOLLOWING GASTRO-ENTEROSTOMY.*†

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DURING the past few years the attention of surgeons has been frequently called to an unfortunate sequel to the operation of gastro-jejunostomy, namely, peptic ulcer of the jejunum. The frequency with which this complication occurs is as yet uncertain, and therefore interest attaches to the record of all fresh cases. Up to date about ninety cases have been recorded, and very complete descriptions of the clinical and pathological features of the condition have been contributed by Mayo Robson,¹ Tiegel,² Schostak,³ Connel,⁴ Van Roojen,⁵ and Paterson.⁶ From the investigations of these and other writers, certain facts regarding this malady have been established, and certain views regarding its etiology have obtained more or less general acceptance.

As an almost necessary introduction to the subject matter of this paper, these data and opinions may here be summarised as follows:—

1. Two types of jejunal ulceration must be distinguished, the one—gastro-jejunal—in which the ulceration occurs at the site of the anastomosis: the other—true jejunal ulceration—in which one or more ulcers form in the jejunum at some distance from the anastomotic opening.

2. In the great majority of cases the ulceration has occurred at or close to the gastro-jejunal anastomosis.

3. The ulceration may manifest itself at any period after the gastro-enterostomy operation, from a few weeks to several years.

4. The formation of the ulcer is usually associated with a recurrence of the gastric symptoms, but in some cases symptoms of perforation have been the first evidence of the ulceration.

5. The tendency to perforation is apparently greater than in the case of gastric ulcer, and the death-rate from such perforation is high.

6. In all the recorded cases the preceding gastro-enterostomy had been carried out for the relief of a *non-malignant* affection of the stomach or duodenum. (Key⁷ has recorded one case as jejunal

* From the Laboratory of the Royal College of Physicians, Edinburgh.

† The expenses of the research were defrayed from a grant made by the Carnegie Trust.

ulcer after gastro-enterostomy for gastric carcinoma, but the evidence is unconvincing.)

7. Jejunal ulceration has been met with after every variety of gastro-enterostomy, but it occurs probably more frequently after an *en Y* type of anastomosis than after the simpler forms of operation.

8. In the majority of cases the preceding gastric lesion had been associated with hyperacidity, but in not a few cases there had been no excess of free acid.

9. The jejunal ulceration is probably caused by the action of the acid gastric juice on the jejunal mucosa, which, under normal conditions, is exposed to an alkaline medium.

This communication deals firstly with the clinical aspect of the subject, and secondly with the results of certain experimental investigations regarding the etiology of jejunal and gastro-jejunal ulceration.

CLINICAL RECORDS.

During the past year one had the good fortune to observe the clinical features, and to investigate the pathology of three cases of jejunal ulceration, which were treated in the clinique of Professor Caird, to whose kindness I am indebted for permission to record them. All three cases were examples of gastro-jejunal ulceration, but in one of them (Case II.) there was in addition an independent jejunal ulcer.

CASE I.—R. B., male, æt. 20.

In February 1905 patient began to suffer from acute gastric pain about one hour after taking food, from heartburn, and from vomiting. For the next year he suffered constantly from these symptoms, and he noted that the amount of vomited matter became gradually larger, and contained the elements of meals taken some days before. There was at no time hæmatemesis or melæna.

In March 1906 he was admitted to hospital presenting the typical features of dilated stomach, the result of pyloric stenosis. A test meal revealed that free hydrochloric acid was present in slight excess of the normal.

Operation.—The pylorus was found to be cicatrised and stenosed, evidently from a healed pyloric ulcer, and the stomach was greatly dilated. A posterior gastro-enterostomy of the Roux's *en Y* type was performed, a particularly large gastro-jejunal opening being made. The patient made a good recovery, and gained weight rapidly. He remained in good health till December 1908. He then began to suffer from gastric pain which came on independently

of the taking of food, but was similar in character to his former gastric pain. He began to vomit again, and this symptom troubled him more and more till he returned to hospital in February 1909.

On examining the abdomen, it was found that the stomach was much dilated, and its outlet was evidently obstructed, for it would occasionally rise up in rigid spasm. A test meal showed the presence of free hydrochloric acid slightly in excess of the normal, and much retained food.

Second Operation.—The stomach was found dilated, the pylorus still much stenosed, and at the site of the gastro-jejunal anastomosis a hard inflammatory mass was felt, and the gastro-enterostomy opening was apparently occluded. This mass was excised, along with the adjacent portions of the stomach and jejunum, and the cut end of the jejunum was then anastomosed with the opening which had thus been made in the posterior wall of the stomach. The anastomosis was thus still of the *en Y* type, but one limb of the *Y* was now shorter than before.

The patient made a rapid recovery, and is in perfect health one and a half years after the second operation.

On examining the specimen removed, it was found that the gastro-enterostomy opening was almost occluded, and would only admit a fine quill. There was great fibrous thickening of the walls of the aperture, and microscopic examination showed that a ring of ulceration was present at the site of the old suture line. Fig. 1 shows a section across the opening (natural size).

CASE II.—C. A., male, æt. 38.

In the year 1900 patient began to suffer from gastric pain and vomiting. On several occasions he vomited a considerable quantity of altered blood. Being in the interior of Africa at the time, and unable to receive proper medical treatment, he had recourse to morphia to relieve the pain. The pain and vomiting persisted off and on for two years. In May 1902 he was operated on in Johannesburg, a cicatricial stenosis of the pylorus was found, and a *posterior isoperistaltic gastro-enterostomy with a long jejunal loop* was performed. This gave relief for only a few weeks, when the pain returned, and he again took to morphia. As the pain and vomiting continued, the abdomen was again explored in November 1903. It was found that the gastro-enterostomy opening had become stenosed, and would not admit the finger tip. A fresh gastro-enterostomy opening of large size was accordingly made. This gave him relief for almost two years, but at the end of this time he again began to be troubled with vomiting, and the pain returned. For the next two and a half years he was constantly troubled with gastric pain and vomiting after taking food, in spite of frequent gastric lavage. The vomited matter was usually green, but sometimes dark brown in colour.

In February 1908 the abdomen was again explored. Numerous

PLATE I.

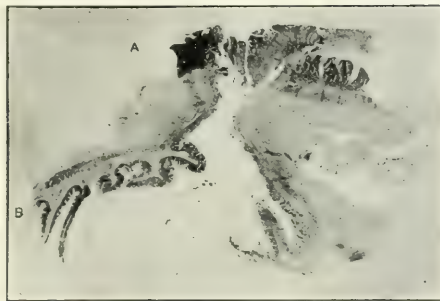


FIG. 1.—Section of stenosed gastro-jejunostomy opening from Case I., showing ulceration at the site of the suture-line. A=gastric; B=jejunal muc. membr. (natural size).

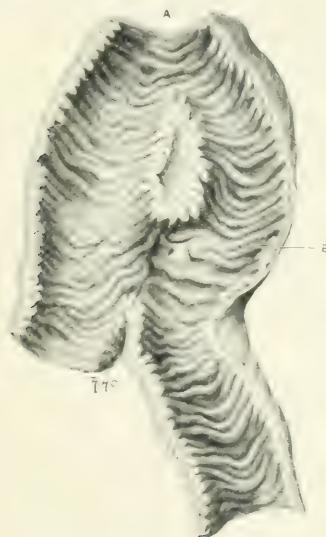


FIG. 2.—Jejunal loop resected in Case II. A = site of occluded gastro-jejunostomy; B = jejunal ulcer.

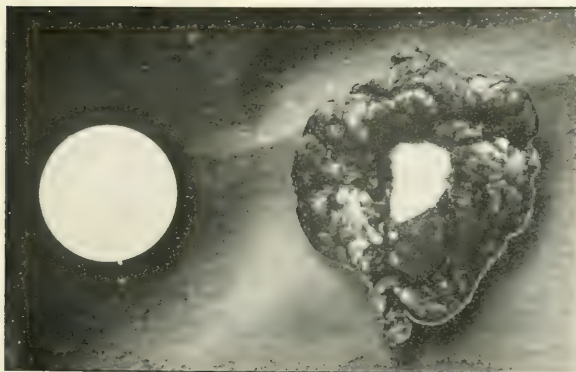


FIG. 3.—Stenosed gastro-jejunostomy opening from Case III, viewed from gastric aspect. Compare size with sixpenny piece.



and dense adhesions were found in the upper part of the abdomen, and on division of these the jejunal loop was found to be considerably distended. A lateral anastomosis between the two limbs of the jejunal loop was performed. Patient got little or no relief from this operation, the pain and vomiting persisted, and he used the stomach tube regularly.

In May 1909, as he was no better, the abdomen was again explored. The pylorus was still greatly stenosed. The upper coils of jejunum were found matted by dense adhesions. On separating these the jejunal loop was found much distended, and the gastro-enterostomy opening greatly cicatrised, and almost totally occluded. The entire jejunal loop, along with the stenosed gastro-jejunal anastomosis, was excised, and a Roux's *en Y* gastro-enterostomy was performed. The patient made a good recovery from the operation, and got entire relief from the vomiting, but having acquired the morphia habit during the preceding eight years, he did not get complete relief from gastric pain.

On examining the loop of jejunum removed at the last operation, in addition to the cicatrised gastro-jejunal ulcer, an independent jejunal ulcer was found close to the lateral anastomosis between the limbs of the loop (Fig. 2).

In this case examination of the gastric contents after a test meal was made before the third and fourth operations, and revealed the presence of free hydrochloric acid in *slightly less than the normal amount*, but on both occasions the material withdrawn from the stomach contained a considerable quantity of regurgitated bilious fluid.

CASE III.—J. S., male, æt. 29.

In 1904 patient began to suffer from severe gastric pain after food, and from vomiting. On several occasions he vomited a quantity of altered blood. The pain and vomiting continued with short intermissions for two years.

In 1906 he was operated on in Paris. Pyloric stenosis was found, and a *posterior antiperistaltic no-loop gastro-enterostomy* was performed. He obtained almost complete relief from his former symptoms, and he remained in good health for almost two years, when the pain returned. The pain resembled closely that which he had formerly suffered, but was rather more to the left side of the epigastrium, and had less relation to the taking of food. Shortly after the return of the pain the vomiting commenced again, and became steadily worse for the next year. On June 1909 he was admitted to hospital.

On examining the abdomen, it was found that the stomach was considerably dilated, and there was an area of very definite tenderness one inch above the umbilicus and half an inch to the left of the mid-line. A test meal showed the presence of retained food in the stomach, and also the presence of free hydrochloric acid in *normal* quantity.

Stenosis of the gastro-enterostomy opening was diagnosed, and the abdomen was explored. A hard, inflammatory mass was found at the site of the gastro-enterostomy, the lumen of which admitted the tip of the little finger with difficulty. This inflammatory mass was excised, along with the adjacent portions of stomach and jejunum, and a Roux's *en Y* gastro-enterostomy was performed. The excision was rendered troublesome owing to the fact that at the previous operation the edges of the mesocolon had been stitched to the jejunum, and access to the posterior wall of the stomach through the thickened mesocolon was very difficult.

The patient made a good recovery, and seen six weeks after the operation, was free from all discomfort, taking full diet, and putting on weight rapidly. Examination of the excised portion showed the gastro-enterostomy to be markedly stenosed (Fig. 3), surrounded by a ring of dense, fibrous tissue of almost cartilaginous consistence, and on the mucous surface, at the site of the old suture line, there were several areas where definite ulceration was still present.

These three cases illustrate the condition of stenosis of a gastro-enterostomy opening as the result of ulceration occurring at the line of junction of the stomach and the jejunum, and Case II. presented in addition a true jejunal ulcer.

In all three cases the gastro-enterostomy was performed for simple pyloric stenosis, the result of pyloric ulcer, and in all three, later operations showed that this stenosis persisted after the performance of the gastro-enterostomy.

In cases I. and III. an interval of two years elapsed between the operation and the appearance of symptoms of stenosis of the gastro-jejunal opening. In Case II. only a few weeks elapsed between the operation and the recurrence of gastric symptoms. In all three cases free hydrochloric acid was present in the gastric contents. In Case I. it was in excess of normal, in Case III. in normal, and in Case II. in subnormal amount. The treatment in each case consisted in the excision of the stenosed anastomosis, and in the performance of a fresh gastro-jejuno-stomy on the *Y* principle, this being the form of operation best suited to the position of parts after the excision.

Case III. illustrated the fact that in the operation of posterior gastro-enterostomy it is advisable to stitch the edges of the aperture in the mesocolon to the stomach rather than to the jejunum. for, in the event of a second operation being required for gastro-jejunal ulcer or stenosis, access to the posterior wall of the stomach is very difficult if the mesocolon be fixed to the jejunum.

EXPERIMENTAL RESULTS.

HYPERACIDITY AND JEJUNAL ULCER.

The experiments, the results of which are recorded below, were carried out to determine, if possible, whether jejunal ulceration is due to the action of the free acid in the gastric juice on the jejunal mucosa. If the acid were the factor determining the ulceration, then all operations of the *en Y* type should be avoided, for in such operations a portion of the jejunum not traversed by the alkaline bile and pancreatic juice is anastomosed with the stomach, and receives its undiluted acid contents.

The experiments were conducted as follows on a series of cats *:—Various types of gastro-enterostomy were performed, and in each case the pylorus was stenosed by the insertion of one or more Lembert sutures. At a certain period after the operation (from 14 to 20 days), feeding with acid was commenced, and the acid diet was given daily for some months. The animals were fed on raw meat, which was cut up, in the direction of its fascial planes, into oblong pieces. Into these pieces a solution of hydrochloric acid was injected until it distended them and formed bulke under the fascia. The cats bolted such pieces without chewing them, and it was found possible to give 7 per cent. hydrochloric acid—*i.e.* practically 1 part in 5 of ordinary concentrated hydrochloric acid solution—in this way. Each cat was given approximately 30 grms. of meat containing 8 c.c. of the acid solution daily for two and a half months. To make sure that the jejunum was really being exposed to acid, in several cases the abdomen was opened one hour after the acid meal, and the reaction of the jejunal contents at various levels was tested. In every case the reaction was found to be *strongly acid*, even as far down as the upper part of the ileum. Eight cats were used in this experiment. The special anatomical features of the different types of anastomosis were produced in an exaggerated form, *e.g.* in a gastro-enterostomy with a loop, the latter was made three to four times as long as is usually done, and similarly in an *en Y* anastomosis the limbs of the *Y* were made from one-half of the total length of the jejunum. The details of the experiment are summarised in Table I.

* That the cat is susceptible to jejunal ulceration after gastro-enterostomy, quite independent of gastric hyperacidity, has been demonstrated by Gould and Harrington.⁸

TABLE I.

	ANIMAL.	OPERATION.	ACID FEEDING.	RESULT.
1.	Cat.	Post. gastro-jej. antiperistaltic, no loop.	7 per cent. HCl in raw meat for 2½ months.	Pyloric stenosis. G. E. opening widely pat. No ulceration in jejunum.
2.	Cat.	Post. gastro-jej. antiperistaltic, no loop.	7 per cent. HCl in raw meat for 2 weeks.	Pyloric stenosis. No ulceration.
3.	Cat.	Anterior operation with long loop.	7 per cent. HCl in raw meat for 2½ months.	..
4.	Cat.	Post. oper. with loop and Braun's lateral anast.	7 per cent. HCl in raw meat for 2½ months.	..
5.	Cat.	Post. oper. of exaggerated <i>en Y</i> type.	7 per cent. HCl in raw meat for 2¼ months.	..
6.	Cat.	Post. oper. of exaggerated <i>en Y</i> type.	7 per cent. HCl in raw meat for 3 months.	..
7.	Cat.	Pylorotomy and post. gastro- enterostomy.	7 per cent. HCl in raw meat for 2 months.	..
8.	Cat.	Control on operation.	7 per cent. HCl in raw meat for 2½ months.	No ulceration.

From this experiment (Table I.) it would appear that the entrance of hyperacid stomach content into a portion of small

intestine unaccustomed to such acid medium is not in itself sufficient to determine ulceration. In similar experiments on dogs, Borzecky⁹ has obtained similar results. Some other factor, be it trauma or vascular disturbance, is evidently necessary to initiate the process of ulceration. The opinion, which is so widely held among surgeons, that jejunal ulceration is specially liable to occur after an *en Y* type of anastomosis, received no support from this or from any later experiment, for, even when the bile and pancreatic juices were conducted into the ileum and the whole jejunum was exposed to hyperacid gastric juice for many weeks, no trace of ulceration was found. Katzenstein¹⁰ has shown, moreover, that in animals bile and pancreatic juice find their way into the stomach at a definite time after the ingestion of food just as readily after an *en Y* gastro-enterostomy as after the ordinary operation.

ETIOLOGY OF GASTRO-JEJUNAL ULCERATION.

The point of interest and importance in regard to gastro-jejunal ulceration is whether the ulcer be a direct sequel to the operation wound, or whether it be an independent, later development. If it be the former, then by some improvement in the technique of the operation or in its after treatment such ulceration might possibly be prevented. From a microscopic study of a large number of gastro-enterostomy wounds at various periods after the operation, one learned that it is a rare exception to get a primary union between the two cut mucous edges, and that the wound usually heals by granulation, taking from five to ten days to heal over. In a similar series of investigations, Gould and Harrington found that after suture there is always some necrosis of the mucous edges, leaving a defect which heals by granulation. Thus, for a week after the operation there is a species of ulceration at the line of junction of the gastric and jejunal mucosa. If this ulcerative area be bathed with hyperacid gastric contents, one can readily imagine how in some cases healing may be indefinitely delayed, and a more or less chronic ulcer may become established.

It was of importance to know how the healing of a gastro-enterostomy wound was affected by hyperacidity of the gastric contents. Bolton¹¹ has shown that gastro-toxic ulcers heal quite as readily when the gastric contents are rendered hyperacid as when the acidity is normal, and he attributes this fact to the greater sterility of the gastric contents when excess of acid is present.

In a second series of experiments one performed the operation of posterior gastro-jejunostomy on cats, producing artificial pyloric stenosis in each case. Twenty-four hours after the operation each animal was given, through a stomach-tube, a certain quantity of a solution of hydrochloric acid, and the administration of acid was continued in this way daily until the animal was killed. After death the condition of the gastro-jejunal junction was investigated by naked eye and microscopic examination.

EXPERIMENT I.—Four cats were employed. On each a posterior isoperistaltic gastro-jejunostomy was performed. From the day following the operation each cat was given daily 40 c.c. of .9 per cent. HCl.

Animal (1) died on the tenth day after operation, and post mortem a *definite gastro-jejunal ulcer*, 1 c.m. in diameter, extending chiefly on the gastric, but also on the jejunal side of line of suture, was found. The silk sutures used for the inner row of sutures at the operation were seen hanging in loops from the floor of the ulcer (Figs. 4 and 5).

Animals (2) and (3) died on the eleventh and thirteenth days respectively. In neither case had the wound healed, and the silk sutures were seen projecting into the lumen of the opening.

Animal (4) died on the eighth day, and presented a normal healing wound.

In Experiment I. the administration of acid appeared to interfere considerably with the healing of the gastro-enterostomy wound, and the unabsorbable silk sutures apparently offered an additional source of irritation. Therefore, in a second experiment, the first factor, the acid, was retained, whilst, instead of silk, catgut was used for the mucous suture, in order to test if the silk delayed the wound healing.

EXPERIMENT II.—Two cats used. On each a posterior gastro-enterostomy was performed, catgut being employed for the inner through and through suture, and silk for the outer Lembert suture. On the day following operation each cat was given, through a stomach tube, 40 c.c. of .9 per cent. HCl, and this was continued daily for three weeks, when both were killed and the anastomosis examined. Perfect union of the mucous surfaces was found.

This would appear to point to the presence of silk sutures at the approximated mucous edges being a factor in causing delayed healing.

As the acid employed in the above experiment was consider-

PLATE II.

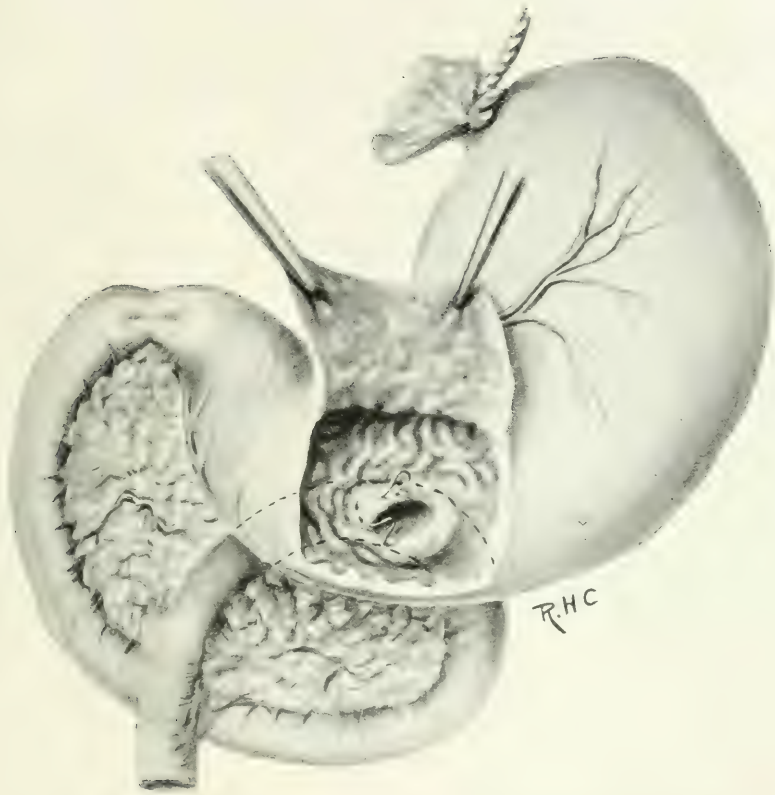


FIG. 4.—Gastro-jejunal ulcer in Cat (1), Exper. I. Note silk suture projecting from ulcer.

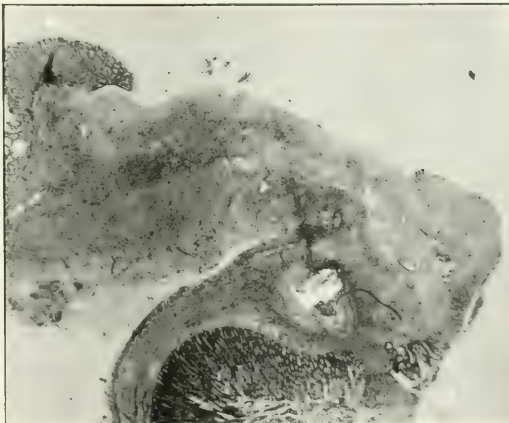


FIG. 5.—Photo-micrograph of ulcer figured above.
A=gastic; B=jejunal muc. membr.



ably stronger than that found even in extreme cases of hyperchlorhydria in the human subject, a third experiment was carried out, in which a weaker solution of acid, .3 per cent., was employed.

EXPERIMENT III.—Four cats were used. On cats (1) and (2) posterior gastro-enterostomies were performed, silk being used for both layers of sutures. On cat (3) a similar operation was done, but catgut was used for the inner suture. On cat (4) a Roux's *en Y* operation was performed, silk being employed for both layers of sutures.

On the day following operation all four animals were given, through the stomach tube, 40 c.c. of a .3 per cent. solution of HCl, and this procedure was continued daily thereafter.

Cat (1) died 4 weeks later, and the gastro-enterostomy wound was found soundly healed.

Cat (2) died 3 weeks after operation. The gastro-jejunal wound had not healed, and silk sutures were projecting from it.

Cat (3) was killed 7 weeks after operation. The wound was soundly healed, no ulcer.

Cat (4) died 6 weeks after operation. To naked eye view the wound had healed, but silk sutures were projecting into the lumen of the bowel.

From Experiment III. it appeared that even .3 per cent hydrochloric acid, given once daily, had some slight effect in retarding wound healing.

In a fourth experiment the administration of acid was delayed until two weeks had elapsed after the operation. The stronger acid solution (.9 per cent.) was then given daily.

EXPERIMENT IV.—Three cats were used. Cat (1). Roux's *en Y* gastro-enterostomy. Catgut used for inner suture.

Cat (2). Posterior, no-loop operation. Silk used for both layers of sutures.

Cat (3). Posterior operation with loop. Catgut used for both layers of sutures.

Cat (1) died $2\frac{1}{2}$ weeks later; wound healed perfectly.

Cat (2) died $2\frac{1}{2}$ weeks later; wound not healed; silk sutures projecting.

Cat (3) died 5 weeks later; wound healed.

In a fifth experiment the effect of trauma along with hyperacidity on the wound healing was tried. The operation was performed after the animal had partaken of a meal of hard, solid food, and after operation it was fed on similar material.

In addition it was given, on several occasions, 40 c.c. of .9 per cent. HCl.

EXPERIMENT V.—Two cats were used. On cat (1) a posterior no-loop gastro-enterostomy was performed half an hour after a meal consisting of lumps of hard meat. Catgut was used for the inner suture. After operation the animal was fed exclusively on meat, which it took readily. On the fourth, fifth, sixth, and seventh days after operation it was given acid through the stomach tube. It was killed on the evening of the seventh day after operation. A *well-marked gastro-jejunal ulcer* was found, and from the floor of the ulcer the silk sutures of the outer Lembert layer were seen projecting (Fig. 6).

Cat (2) received exactly the same treatment as cat (1). It was killed on the seventh day after operation. The gastro-enterostomy wound was found to have healed, except at one point, where a small, round ulcer, 2 mm. in diameter, was present.

From this experiment one concluded that trauma may play a considerable part in delaying the healing of a gastro-enterostomy wound, and so in favouring the persistence of a gastro-jejunal ulcer; one must add, however, that along with trauma the factor of sepsis was introduced in this experiment, as for some time after a meal the stomach contents contain living bacteria in great numbers.

Another point which was investigated in the course of these experiments was *artificial closure of the pylorus*, meaning, by closure, a functional occlusion of that outlet. In all the above-mentioned experiments, and in some twenty others in which gastro-enterostomy was performed, the pylorus was stenosed by inserting, in most cases one, but in a few cases two Lembert sutures, taking a deep bite of the muscular coats. The animals so treated were examined post mortem at periods of from one week to eight months after operation, and in all but one case the pylorus was found stenosed, drawn up under the liver, and apparently not functioning as a gastric outlet, whilst the gastro-enterostomy opening was usually widely patent. Several of the cats were killed shortly after a large meal, when food was found in the jejunum below the gastro-enterostomy opening, but never in the duodenum. This is illustrated in Fig. 7.

From the results of these experiments one feels justified in drawing the following conclusions:—

1. Hyperacidity of the gastric contents will not of itself bring about ulceration in the jejunum after the operation of gastro-enterostomy.

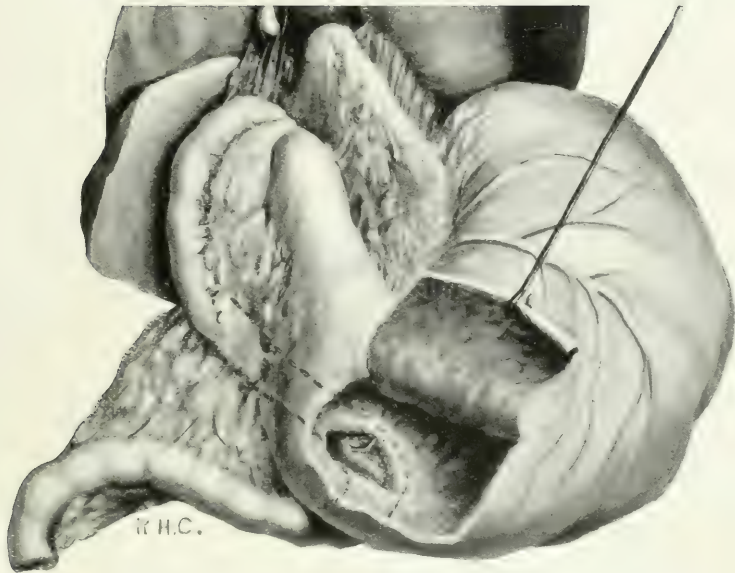


FIG. 6.—Gastro-jejunal ulcer in Cat (1, Exper. V. Delayed healing from trauma and hyperacidity. Pylorus stenosed and drawn up.

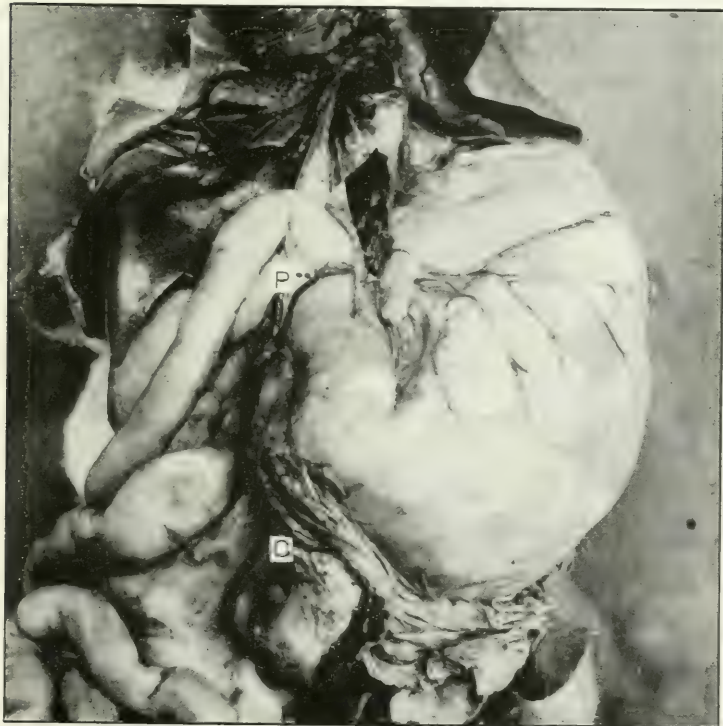
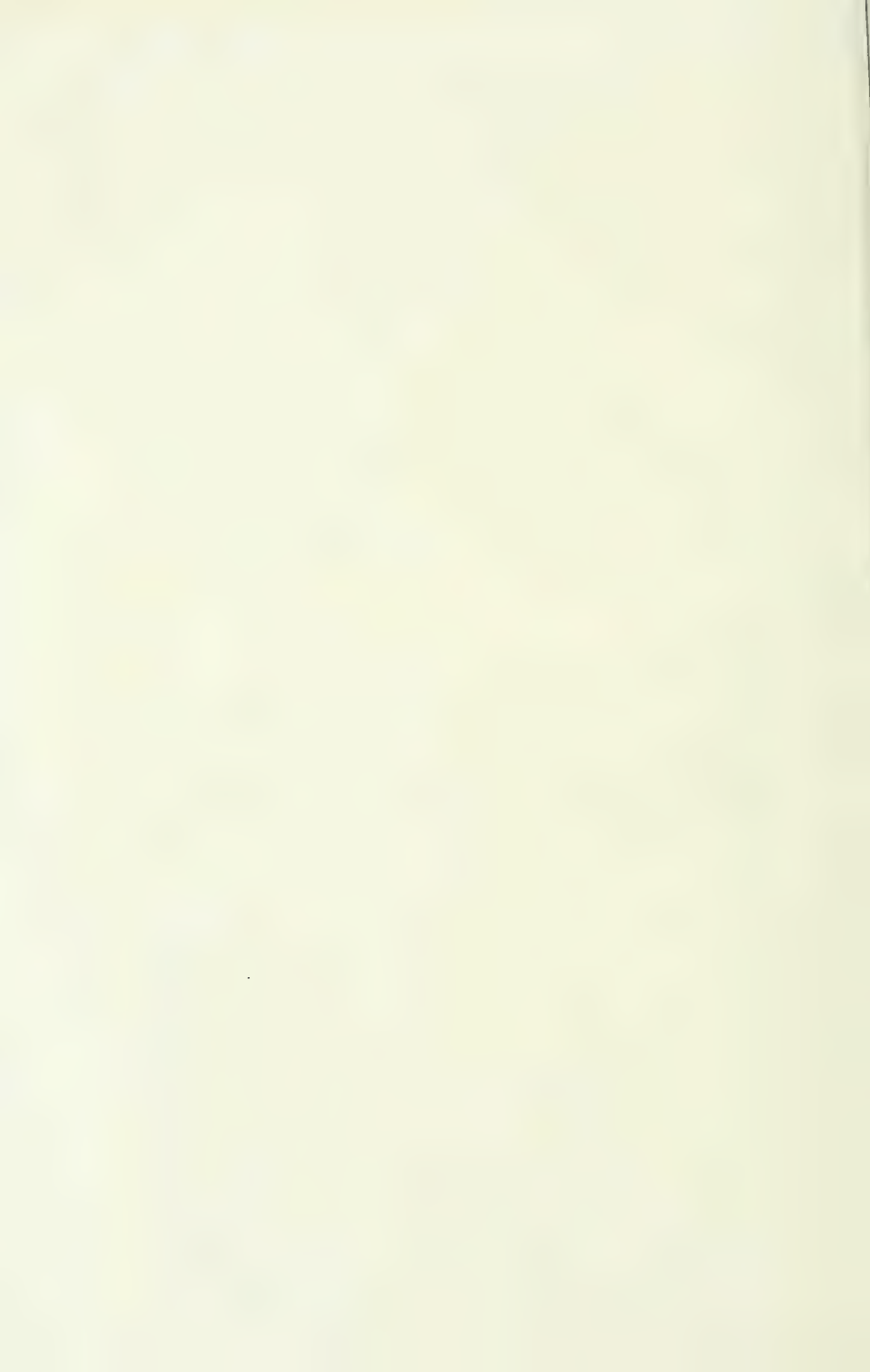


FIG. 7.—Artificially produced pyloric stenosis, one Lembert suture was inserted at pylorus. Posterior gastro-jejunostomy. P=pylorus stenosed and drawn up; G=site of gastro-jejunostomy.



2. The union of the cut edges of the gastric and jejunal mucous membranes, after the operation of gastro-enterostomy, takes place by granulation, taking on an average seven days to be complete.

3. Marked hyperacidity of the gastric contents tends to retard healing, and may lead to an extension of the ulcerative process, which, in some degree, is invariably present.

4. Trauma, as for example, from solid food passing over the granulating area, is an important factor in retarding the process of repair.

5. The presence of an unabsorbable suture in the granulating area tends to delay repair. It is therefore advisable to employ some absorbable material, such as catgut, for the inner suture. (Van Roojen, in his communication on this subject, records five cases of chronic gastro-jejunal ulcer, operated on many months after the original gastro-enterostomy, in all of which a portion of a silk suture was found projecting from the base of the ulcer. He also comes to the conclusion that catgut should be used for the inner suture.)

6. Chronic gastro-jejunal ulcer, as found in the human subject, is probably due to a failure of the gastro-enterostomy wound to heal completely, owing to any of the causes mentioned above.

7. In cases in which the operation of gastro-enterostomy has been performed, functional closure of the pylorus may be simply and effectively brought about by one or two suitably-placed Lembert sutures.

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II.

THE CARE OF THE INFANT AND YOUNG CHILD
(TO FIVE YEARS) IN EDINBURGH.

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(Continued from p. 216.)

IN the United States of America not only is the milk supply very carefully supervised, but in most of the large cities regulations exist regarding the supply of special milk for the use of infants. This milk is medically certified; it comes from tuberculin-tested cows, and has a bacterial content of less than 10,000 bacteria per c.c.

Owing to the intricacies of infant-feeding considered advisable by medical experts in that country, there exist, in addition, many farms and dairies where milk, as nearly pure as it is humanly possible to obtain it, is on hand for infant use on the prescription of a physician. Many milk depots also exist throughout the country.

In New York there is an "Association for Improving the Condition of the Poor," and, connected with this, is a "New York Milk Committee." This committee has recently issued a report, entitled "Infants' Milk Depots and their Relation to Infant Mortality," from which I take the following:—"In order to help reduce infant mortality, and to throw light upon important matters connected with it, the milk committee last spring decided upon a year's campaign, of which the following is the first quarterly report:—

"Its purpose, apart from the actual good which it hoped to accomplish through the saving of lives, was educational and constructive. It aimed to build upon foundations already laid, to take advantage of all demonstrated facts, rules and principles, and, with them as a starting-point, to see if, by any improvement, combination or arrangement, a better plan of reducing infant mortality than that which had hitherto existed could be worked out."

In most large cities in America similar agencies are at work, and the personnel of the "Committee on Milk and Baby Hygiene in Boston" is given as follows by the medical director¹:—

"I am often asked the question—What is the committee? It

¹ "Some Results of the Work of the Committee on Milk and Baby Hygiene in Behalf of Babies." By John M. Connolly, *Boston Med. and Surg. Journ.*, 3rd February 1910.

is an independent, self-constituted group now numbering thirty-seven. The chairman is Mrs. Mary Morton Kehew, President of the Women's Educational and Industrial Union; Dr. Walter B. Cannon, Professor of Physiology in Harvard Medical School, is Secretary; Mr. Arthur H. Brooks, an attorney, is Treasurer. It embraces the Professor of Preventive Medicine at Harvard; the Presidents of the Associated Charities, Children's Aid Society, Floating Hospital, New England Pediatric Society and the Massachusetts Red Cross; the Chairmen of the Board of Health, the Children's Institutions Department, the Health Committee of the Women's Municipal League; the chief of the Boston Milk Inspection Bureau; the headworkers of five social settlement houses, and the executives of several of the principal charitable societies; ten teachers in Boston medical colleges; and last, but not least, five practical dairymen."

On the 11th and 12th of November 1909 a conference called by the American Academy of Medicine was held, and, at its close, "The American Association for Study and Prevention of Infant Mortality" was organised.

In France, organisations exist called "Consultations de Nourissons." Some of these agencies are attached to maternity hospitals, and by means of them the children born in the hospital are kept under regular medical supervision for the first two years of life, while others act independently of hospitals. Again, other institutions, styled "Gouttes de Lait," are practically milk dispensaries from which infants are fed, under medical supervision, on milk supplied at the institution. At all these institutions the feature of the work—and the work is extremely successful—is the systematic medical supervision of the children, and, in most of them, "the milk is only supplied on the condition that the child is brought up once a week to be weighed and examined by the doctor who presides over the institution. It is in the matter of medical supervision that the chief difference lies between these French institutions and those" in Great Britain.

Similar institutions are now common throughout all European countries, and, in addition, most modern children's hospitals have connected with them a "milk kitchen."

In our own country, infants' milk depots, somewhat after the style of the French "Gouttes de Lait," have been established in many towns, most of them being, however, under the control of the municipal authorities. In this relation, M'Cleary says:¹ "The

¹ *Infantile Mortality and Infants' Milk Depots*, 1905.

usefulness of the depot would be much increased if a consultation formed part of the organisation, as in the Goutte de Lait, especially if the consultation were open to nursing mothers. In this way the depot could be made a nucleus, not only of a Consultation de Nourissons, but also of a more extended organisation for the encouragement of breast-feeding. Such an organisation, including religious and social workers amongst its active members, should be established in every district."

Under the aegis of the Local Government Board, two National Conferences on Infantile Mortality have been held in London, and there is some prospect of a third being held in the near future. Such conferences are, however, not necessarily associated with any permanent working institutions.

In 1905 there was held in Paris what was called the first Congress of the Gouttes de Lait; in 1907 the second Congress was held at Brussels, where it was decided to widen the scope of work to the protection of early child-life; and the third Congress of the International Union for the Protection of Early Child-Life is to be held at Berlin in 1911.

A report has been published by the permanent committee which met at Buda-Pesth in August 1909, and in most European countries, but not in Great Britain, National Committees have been formed in connection with the International Union.

Having in view the foregoing facts, it seems to me that the time is ripe, and that present conditions insistently call for practical forward steps.

The unnecessary loss of life and injury to health in early childhood in Edinburgh, while largely due to the effects of poverty, ignorance, and neglect, is directly occasioned by very various causes.

The agencies dealing with these conditions are many, but there is, undoubtedly, need for closer practical co-operation in their working, more especially in view of the statement in the report of the Poor Law Commission upon Scotland that "the poverty problem in Edinburgh, in so far as it is a money problem, does not arise from want of money, but from want of an intelligent working together of all the charities."

There is need, also, to emphasise the importance of adequate medical supervision, more especially in relation to agencies connected with the supply of milk or the feeding of young children.

The question of the supply of clean, cheap milk for young children is a clamant one, and although this is merely a part of

the much larger question of the regulations governing the general milk supply of the country, yet, while waiting for the satisfactory settlement of the wider issue, it would be of immediate practical value to develop such a plan as that of the milk depot whereby the child receives at least a safe milk. To be effective, the prescription and distribution of such milk should be under direct medical supervision.

Lady health visitors, milk depots, and all the various agencies concerned are only satisfactorily effective when associated with competent medical advice. As Holt says, in speaking of visitors, "they must not only be tactful in the management of patients, but must possess the special knowledge and training which qualifies them for the work. These teachers must themselves be properly instructed if results are to follow."

Except as regards suckling, every important factor at work in connection with children under one year of age is also a factor of great, if less, importance during early years; and while local authorities may be engaged in attempting the supervision of infancy, the benefits resulting from their labours would be more sure and lasting if these labours were closely identified with those of all other relief institutions.

Although there have been two National Congresses on Infantile Mortality held in this country, there is no existing permanent association, and, so far as I can learn, the International Union for the Protection of Early Child-Life is looked upon with distinct favour by those in this country who are interested in such agencies.

But this subject is being approached from many sides.

The municipal authorities are taking action with regard to the first year of life, and in connection with the Public Health Department a large band of voluntary lady health visitors, now numbering hundreds, is actively engaged in visiting, encouraging, and instructing poor mothers.

The School Board is developing "Care Committees" and widespread visitation of homes, and by means of these visitors, mothers may be instructed in the efficient care of young children under school age.

There is also in process of evolution a "League for the Conservation of Home Life," which aims at the world-wide dissemination of its views: at "the co-operation and approval of charitable societies and associations, and of religious and public bodies throughout the world;" at "combining the efforts of State,

Church, and philanthropy along the lines that will lead to the desired end," "by considering and inquiring into all the phases of a child's life, and dealing with the question as a whole."

It is obviously inadvisable to suggest new mechanism for dealing with the question. The mechanism in existence or in construction is already redundant.

From whatever source and along whatever lines progress is to be made, closer co-operation is a *sine qua non*, and in order that such progress may be practical and efficient, it must be under medical guidance.

I am well aware that it is dangerous to dissipate energy, and, consequently, I restrict my proposals to matters concerned with the provision for poor children of clean, comparatively cheap, milk.

It appears hopeless to look for a general supply of clean non-tuberculous milk in the near future, but it is certainly surprising to note the apathetic attitude of well-to-do parents towards the standard of cleanliness of the chief food of their children, and the weak-kneed subterfuges they are willing to adopt to obviate the glaring dangers. Young children in the west end drink as much milk as those in the east end; the dangers latent in it are, doubtless, less acute, yet they are great.

For the children of the poor, some form of milk dispensary is, I think, essential. It may be said, "Look at Glasgow!" Well, look at Glasgow. Glasgow made a mistake and had the sense and courage to own it. But the fact that an extravagant, ill-balanced scheme of milk provision for poor children proved a costly failure in Glasgow is no reason why Edinburgh should refrain from concerted action, along economical lines, in tackling the problem. Great expense is unnecessary; elaborate technique is out of place; the very sick baby is a baby for hospital treatment as in- or out-patient.

What we want is a milk-distributing centre in four or five of the poorer districts of the town—milk from which must be sold at cost price.

At each centre, at least once a week, a doctor should attend, and the milk be supplied under his direct supervision. This supply would be in sealed bottles, each bottle containing the amount for one feed; and the modification of the milk would consist in simply scalding and mixing with water.

By some such means, and with the co-operation of the lady

health visitors, a supply of safe nourishment could be ensured for healthy babies.

For many sick babies this supply would also be suitable. The condition of the child, however, might necessitate further refinement of milk modification. In this case, for educational purposes, the mother should, if possible, undertake it at home; but if the mother were unusually busy, ignorant, or dirty, the case would be a suitable one for treatment at a milk kitchen directly connected with a hospital. Such a laboratory is, of course, purely the concern of the hospital. Apart from it, the expense of such a milk scheme would be insignificant.

Connected with the Public Health Department of the city we have a large band of lady health visitors, whose visitation would go far to ensure success, and we have several junior physicians, unconnected officially with a hospital, but specially well trained in infant feeding, who are able and willing to undertake such duties as have been outlined.

Lady health visitors and physicians dealing with young children of the poorest class alike largely plough the sand in their efforts at the preservation or restoration of health, owing to the want of proper nourishment for their charges.

This want, I contend, is not due to lack of philanthropy in the town, but to misdirected philanthropy and the impossibility of obtaining a supply of safe, guarded milk suitable for young children. For cases attested as deserving by a health visitor, there are many philanthropic agencies through which financial aid could be obtained if a reliable supply of milk for infants was on the market.

Any scheme of this nature is bound to prove inadequate to meet the requirements in many individual cases. It is associated with so many vital questions of social life that it must be restricted to comply with broad general principles.

The first of these principles is the importance of education, the inculcation of facts concerning hygiene, the development of self-effort along proper lines. It is obviously unwise to do for the child's guardian what that guardian can do herself: when possible, milk modification must be undertaken at home. The milk, again, must be sold on business lines; it must be clean and guarded (bottled), but there must be no underselling of the dairies.

I believe economy in the running of such a scheme is another vital principle; expense must be reduced to a minimum. Mixing

the milk with water, when necessary, scalding this mixture, and bottling in separate feeds is sufficient procedure, and need be associated with but light expense.

There must be no draining of the resources of one class of society to meet the necessities—honest, or perhaps unnatural—of another class. But I think it is nothing more than ordinary humanity—not to mention self-interest as a community—that it should be possible for a guardian to obtain, by the expenditure of money, a safe supply of milk for his young children. At present this is impossible.

In the educated well-to-do class the danger is that of infection of the milk as obtained from the dairy; home infection of it is, or should be, practically non-existent. In the poorer class both types of danger are very real, and to meet the double danger milk must be scalded, and bottled in amount and composition suitable for a feed.

We are attempting to stamp out tuberculosis, and I entirely agree with those whose efforts are directed towards the segregation of infected individuals, and the rendering innocuous of obvious sources of infection. But I consider that a most important auxiliary step in the campaign will have been taken when a guarded supply of safe, cheap milk is on the market.

In the above I voice not only my own convictions and opinions on this subject, but, I am confident, the opinion of the entire medical and surgical staff of the Royal Hospital for Sick Children, as expressed at a recent meeting summoned by them to discuss the question.

At that meeting an influential committee was appointed to further the unanimous expression of opinion that "immediate benefit will be conferred on poor children in Edinburgh by closer co-operation of relief agencies, by stricter regulation of the milk supply, and by the development of special milk depots under direct medical supervision."

But is not the subject one which demands an expression of opinion from the mass of medical practitioners in the city?

I think such procedure would be consonant, not only with the best interests of the citizens at large, but also with the eminent position of the medical profession in the city.

CLINICAL RECORD.

CASE OF UNUSUALLY LARGE GALL-STONE IMPACTED
IN COMMON BILE DUCT.

By P. KINMONT, M.D., F.R.C.S.,

Surgeon to Newark-on-Trent Town and District Hospital.

THE following case of unusually large gall-stone impacted in the common bile duct presents some features of interest:—

Present Illness.—Mrs. S. H., æt. 56; four children. The patient has been out of sorts and dyspeptic since Christmas 1909, a period of four months. She was taken very ill suddenly on 28th April 1910, with pain in the right side of the abdomen and in the pit of the stomach, with vomiting, shivering, and jaundice. The pain was very severe, and extended to the right shoulder. She was admitted to Newark Hospital the same day.

Previous Health.—Previous to Christmas 1909 the patient has had fairly good health, but was always troubled with constipation, and has had indigestion off and on for a long period. Twenty-three years ago she had an attack of jaundice, lasting for a week, somewhat similar to the present attack, but not so severe in character. The indigestion took the form of discomfort after meals—about an hour after—with flatulence. She has had no other illness of importance.

On Admission.—The patient was found to be well nourished, but not obese. She was deeply jaundiced, and in a state of partial collapse. She complained of severe pains in the epigastrium and right hypochondrium. The tongue was dry, brown, furred, and cracked; the pulse regular—100 per minute—fair volume and low tension; heart sounds weak; temperature, 101·6° F.; respirations, 24 per minute, lungs normal; urine faintly acid, specific gravity 1018, dark brown colour, no albumen or blood; marked reaction to bile; the fæces were clay coloured.

Abdomen.—Inspection revealed nothing abnormal; movements on respiration fairly good; on palpation slight tenderness over region at tip of ninth costal cartilage, and a considerable amount of muscular resistance; the lower edge of liver was felt two fingers below costal margin in nipple line. A large cystic mass could be detected in the right hypochondriac and lumbar regions, reaching about 1½ inches below the umbilicus; it was freely movable. Percussion showed this mass to be dull, and the liver enlarged downwards.

Diagnosis.—Impacted stone in common bile duct.

Operation.—On 30th April, under ether anæsthesia, the abdomen

was opened by a vertical incision through the right rectus muscle 5 inches in length. As this did not give sufficient access, the incision was prolonged upwards and inwards at the upper end, as recommended by Mayo Robson, dividing the upper attachment of the rectus. The gall-bladder presented in the wound, along with the lower edge of the enlarged liver. The gall-bladder was withdrawn and tapped; about 2 oz. of viscid, clear, mucoid fluid were withdrawn, along with a small amount of bile. The gall-bladder contained numerous varying-sized stones, which were removed. The wound in the bladder was seized with forceps, which were twisted to close the opening, and the whole enveloped in sterile gauze. The liver was then drawn downwards, and its lower surface everted into the wound. On palpating the under surface, a large, hard mass was encountered, which at first gave the impression that one was dealing with a malignant growth at the head of the pancreas, but on further exploration proved to be the common duct, containing an enormous stone, which was removed with difficulty by an incision about $1\frac{1}{2}$ inches long. After its removal much bile escaped, and numerous smaller stones were removed from the cystic and hepatic ducts. The common duct was much dilated, and felt just like a calcareous aorta. The duct was drawn well up into the wound and easily sutured with a double row of silk sutures. A large tube was then inserted into the gall-bladder and fixed to the wound in the bladder by a few strong catgut sutures. The gall-bladder was then returned into the abdomen and fixed to the parietal peritoneum by a few catgut sutures. As the patient was considerably collapsed, the layers of the abdominal wall were drawn together *en bloc* by strong silkworm-gut sutures after a gauze drain had been inserted down to the common duct. There was no troublesome bleeding during the operation. In addition to the large stone (see Fig.), there were thirty-seven other stones about the size of marbles, and numerous small ones. The total weight of the stones was 3 oz. 20 grs. The large stone measured 3 ins. by $1\frac{1}{4}$ in.

After the operation was completed the patient was given ℞iii. liq. strychninæ hypodermically, and 1 c.c. pituitary extract, also a large subcutaneous saline infusion in the axilla. Those helped to tide over a very considerable shock. There was slight sickness next day. The pulse was 90, and the temperature subnormal.

Subsequent Progress.—30th April.—Half a pint of saline injected subcutaneously every 3 hours; liq. strychnin. ℞iii. 3-hourly; brandy, ℥ii. 3-hourly.

1st May.—Patient feels comfortable, no pain or sickness; pulse, 120; temperature, 98.6 F.; wound clean; the tube in the gall-bladder was aspirated, and some bile-stained mucus withdrawn; salines continued.

2nd May.—Pulse much improved; jaundice lessened; urine contains less bile; bowels moved three times, large pultaceous masses containing bile.



Gall-stone removed from common bile duct
(actual size).



3rd May.—Tongue very dry and coated brown ; thirst marked ; wound clean ; discharge of mucus continues from tube in gall-bladder, but little bile.

4th May.—Pulse, 104 ; evening temperature, 100·8° F. ; salines transferred to thigh ; great thirst ; tongue still very dry ; a little suppuration at upper stitch in abdominal wound ; bowel evacuations good colour ; jaundice less marked, and less bile in urine ; gauze-plug leading to common duct renewed.

5th May.—Rectal salines, $\bar{5}$ x. 3-hourly, instead of subcutaneously ; tongue still very parched.

7th May.—Drain to duct removed ; tube still left in bladder ; tongue very dry still.

11th May.—Temperature rose to 101° F. last evening at 10 P.M. ; at 2 P.M. to-day was 103·8° F. ; slight rigor ; fell to 100° F. at 6 P.M. ; vomited once ; dressed ; tube to gall-bladder removed ; wound clean ; gall-bladder emptied by suction ; some small fragments of stone removed ; gauze drain again put down to common duct ; evening temperature, 101·2° F. ; pulse, 108 ; quinine, gr. v. 4-hourly.

12th May.—Feels much better this morning ; temperature, 98° F. ; no vomiting ; pulse good ; wound looks clean ; tongue still dry and cracked.

13th May.—To-day there are signs of pus formation at sites of saline injections ; wound opened, and considerable amount of foul pus evacuated.

14th May.—Abscess wounds enlarged, not draining well.

15th May.—7 A.M.—Convulsive movements observed in the hands ; convergent squint in each eye with ptosis ; respiration slightly stertorous ; left-sided hemiparesis of face, with some aphasia ; consciousness unimpaired ; temperature subnormal ; pulse 92.

10 A.M.—Respirations more stertorous ; marked convergent squint ; pupils equal and react to light, and are moderately dilated ; consciousness now impaired ; cannot speak ; limbs flaccid ; Babinski sign present on both sides ; blistered behind the ears, and ol. crotoni, \mathcal{N} i. given.

6 P.M.—Consciousness regained ; still weakness of facial muscles on left side ; speech unimpaired ; pupils react to light and accommodation ; movements of ocular muscles good ; bowels moved three times ; says she feels “all right” ; tongue parched.

16th May.—No signs of yesterday’s attack ; morning temperature, subnormal ; evening temperature, 101·8 F. ; tongue moist for first time to-day ; Babinski sign less marked.

17th and 18th May.—Temperature again rising ; morning, 99° F. ; evening, 102·4° F. ; pulse, 100 ; feels well ; wound quite clean ; no pain on abdominal palpation ; no sign of pus collection.

25th May.—The condition during the last week has been almost

unchanged. Though expressing herself as well, and taking nourishment freely, the condition remains unsatisfactory. There is no jaundice, and bile is passing freely in motions, but the temperature shows an evening rise to about 101° F., and a morning fall to subnormal, the pulse varying from 100 to 106. The discharge from the gall-bladder contained coli-like bacilli. A vaccine was prepared from these organisms.

30th May.—Slight rigor to-day; injection of vaccine, 5 millions.

1st June.—Injection vaccine, 5 millions; morning temperature, 97.6° F.; evening temperature, 100.4° F.

2nd June.—Injection vaccine, 10 millions; morning temperature, 99.6° F.; evening temperature, 100.8° F.

3rd June.—Injection vaccine, 10 millions; morning temperature, 97° F.; evening temperature, 99.8° F.

4th June.—Injection vaccine, 25 millions; morning temperature, 27.6° F.; evening temperature, 100.4° F.

6th June.—Since vaccine injections were begun there has been a decided improvement in the patient's condition; she looks better, and feels better, and sleeps well; there have been no untoward symptoms nor marked depression; the temperature has fallen considerably; the pulse remains at 100; tongue moist and clean.

8th June.—Temperature again up to 101.8° F.; 50 million injection given, and again on 11th.

13th June.—Temperature morning and evening was subnormal, and patient's condition is satisfactory.

The wound to the gall-bladder discharges a small quantity of viscid mucus; no bile.

28th June.—Patient up last two days; has gained much flesh, and feels very fit; enjoys solid food.

Remarks.—The points which seem to me of interest in the case are—

1. The comparative good health enjoyed by the patient with so large a stone in the common bile duct, and the single attack of jaundice twenty-three years ago.

2. The remarkable dimensions of the stone impacted.

3. The free access obtained by the incision recommended by Mayo Robson. This, together with a sandbag placed beneath the patient's back, a little above the level of the liver, gave perfect access to the ducts, and enabled one to carry out the necessary manipulations with great ease. The result is enhanced by a slight elevation of the patient's head and lowering of the feet. The bowels fall away into the pelvis, and render the whole operation area accessible. In this case the duct was incised and sewn up practically outside the abdominal wall, thus enabling one to deal effectively with the large escape of bile after the stone was removed from the duct.

4. The saline infusions, which were used three-hourly for the first three days after the operation, proved of great value in tiding over the shock, and, I think, accounted for the good pulse condition. To avoid frequent punctures the cannula was left *in situ*, which probably accounted for the abscesses which developed.

5. The vaccine, prepared from the patient's own organisms, and used at a stage when her condition was most unsatisfactory and almost hopeless, proved of enormous benefit, and the change in her condition was remarkable. The exhausted, pinched facial expression quickly gave place to a bright and cheerful look and an increased sense of well-being. I have seen it recorded that the B. coli serum gives rise to considerable depression, but no such effect was produced in this case.

6. The curious nervous attack, with a true Babinski reflex, at the height of the illness, the explanation of which is obscure. The attack suggested to one's mind a basal effusion. Its duration, however, was short, and it cleared up completely.

I am indebted to Dr. G. H. Heard, the House Surgeon, for his careful notes and sustained interest in the case, and to the nurses for their skill in the after-treatment.

MEDICAL EDUCATION IN SCOTLAND.

A CANDIDATE desirous of obtaining a legal qualification to practise medicine must conform to the regulations of the General Medical Council, which require (1) that the candidate must first pass a preliminary examination; (2) must register as a medical student; (3) must study for at least five years at a school of medicine recognised by the General Medical Council; (4) must obtain a degree or diploma recognised by the Council; and (5) must enter his name on the official list of medical practitioners, the *Medical Register*. No person whose name does not appear on the *Medical Register* may legally sign certificates, give medical evidence in Court, or sue for fees.

Provided these regulations are conformed to, the candidate has a wide choice of medical schools, and may proceed to take either a University degree or a diploma of the other licensing bodies. Those available in Scotland are as follows:—

Degrees.—The Scottish Universities confer the degrees of Bachelor of Medicine and Bachelor of Surgery (M.B., Ch.B.) on candidates who have attained the age of twenty-one. These degrees admit to the *Medical Register*. The higher degrees, Doctor of Medicine (M.D.), Master of Surgery (Ch.M.), may be registered as additional qualifications.

Diplomas.—The Royal College of Physicians of Edinburgh, the Royal College of Surgeons of Edinburgh, and the Royal Faculty of Physicians and Surgeons of Glasgow co-operate in conducting Examinations for the *Triple Qualification* (L.R.C.P.E., L.R.C.S.E., L.F.P.S.G.), which admits to the *Medical Register*. Like the higher degrees of the Universities, the Fellowships and Licences of any of these corporations may be registered as additional qualifications.

Special degrees and diplomas are granted to qualified persons in the department of public health.

THE UNIVERSITIES.

PRELIMINARY EXAMINATION.—Each student must pass this examination before commencing medical study. At the matriculation office of each University, candidates can obtain schedules, which must be filled up and lodged not later than certain dates in March and September respectively. The fee for examination is 10s. 6d., and should be paid at the time of lodging the schedule. Candidates are examined on the following subjects:—

1. *English.*—A single three hours' paper will be set, containing an Essay, a Paraphrase, two questions on History, two in Geography, four on Grammar (including Correction of Sentences, Parsing, Analysis of Sentences, and Derivations), two of a literary and general kind. Eight answers will be required. The Essay, the Paraphrase, one answer in History, and one in Geography will be compulsory.

2. *Latin.*—Translation, Parsing, Grammar, Prose Composition, and Sentences.

3. *Elementary Mathematics.*—(a) Arithmetic (fractions, proportion, percentage, square root, and simple interest); (b) Algebra (fractions, factors, square root, equations of the first degree, simultaneous equations of the first degree, quadratic equations and problems leading thereto); (c) Geometry (Euclid, Books I., II., and III., or their equivalents, with simple deductions).

(4) *Greek, or French or German.*

French or German.—Grammar, translation into English and into French or German, and short idiomatic sentences for translation from English.

Greek.—Grammar, translation into English, and of short sentences into Greek.

In the case of a candidate whose native language is not English, an examination in the native language of the candidate may be substituted for one in either French or German, and an examination in any other classical language for one in Latin or Greek.

It is compulsory that the subjects be passed at not more than two examinations, but there is no restriction on the number of times the candidate may present himself for examination. A degree in Arts or Science in any University of the United Kingdom, and in any Colonial or Foreign University specially recognised; the Lower Grade Leaving Certificate of the Scottish Education Department, and certain other examinations, are accepted as equivalents for the preliminary examination. The preliminary examination conducted by the Educational Institute of Scotland is not accepted as an equivalent examination.

MATRICULATION.—Having passed the preliminary examination, the student must, within fifteen days after the commencement of the session, make the required entries in the Matriculation Album of the University, and pay the matriculation fee, which is one guinea for the whole year, half a guinea for the summer session alone. The student must matriculate each year of study.

REGISTRATION.—Within fifteen days after commencement of study, he must register as a medical student. He must be not less than sixteen years of age, must have passed the preliminary examination, and must produce to the Registrar (James Robertson, Esq., 54 George Square, Edinburgh) an application form duly filled up, showing that he has commenced medical study.

THE CARNEGIE TRUST.—This Trust is prepared to pay the class fees of students (who have passed the specified preliminary examination) for all classes, whether attended within the Universities or in any of the Extra-Mural Schools. The Trust is also prepared to pay the class fees for students proceeding to the Triple Qualification, provided that the applicant has passed the preliminary examination recognised by the Trust. It is also prepared to pay the fees for the various special classes given by many of the Lecturers upon advanced and non-compulsory subjects. Three qualifications are demanded: the applicant (1) must be over sixteen years of age; (2) must be of Scottish birth or extraction, or must have given two years' attendance after the age of fourteen at a school or institution under inspection of the Scottish Education Department; and (3) must be qualified by preliminary examination under the ordinances of the Scottish Universities Commission and the regulations of the Joint Board of Examiners, to attend the classes for which payment of fees has been claimed. Schedules of application for admission to the benefit of the Trust are obtainable by written application to the Secretary of the Trust, 14 Hanover Street, Edinburgh.

PROFESSIONAL EDUCATION AT THE UNIVERSITIES.

At the present time the medical curriculum suffers from overcrowding. This has arisen from the rapid growth of medical science, and the attempts which have been made from time to time to graft new subjects on to an old system.

Various schemes for the reformation of the curriculum are at present under consideration.

EDINBURGH UNIVERSITY.

The following order of study is recommended :—

A.—For Students Beginning in Winter.

FIRST YEAR.

First Half of the Winter Session—

Chemistry. Chemistry (Practical). Anatomy. Physics

Examination in Physics.

Second Half of the Winter Session—

Chemistry—*continued*. Chemistry (Practical)—*continued*.

Anatomy (Practical).

Examination in Chemistry.

Summer Session—

Botany. Botany (Practical). Zoology. Zoology (Practical).

Anatomy (Practical).

Examination in Botany and Zoology.

SECOND YEAR.

First Half of the Winter Session—

Anatomy (Practical). Physiology. Physiology (Experimental).

Second Half of the Winter Session—

Anatomy (Senior). Anatomy (Practical). Anatomical Demonstrations.

Physiology—*continued*. Physiology (Chemical).

Summer Session—

Anatomy (Practical). Anatomical Demonstrations. Histology.

Examination in Physiology.

THIRD YEAR.

First Half of the Winter Session—

Surgery. Pathology. Pathology (Practical). Anatomical Demonstrations. Anatomy (Practical). Hospital Attendance.

Examination in Anatomy.

Second Half of the Winter Session—

Surgery—*continued*. Pathology—*continued*. Clinical Surgery.

* Materia Medica (Practical). Post-Mortems. Vaccination.

Examination in Practical Materia Medica (if not taken previously).

Summer Session—

Practical Pathology (if not taken in Winter). Clinical Surgery.

Post-Mortems.

Examination in Pathology.

FOURTH YEAR.

First Half of the Winter Session—

Medicine. Materia Medica. Midwifery (including System. Gynaecol.).

Clinical Medicine. Medical Out-Patients. Dispensary. Fevers.

* May be taken in Summer following.

Second Half of the Winter Session—

Medicine—*continued*. Materia Medica—*continued*. Midwifery—*continued*.
 Clinical Medicine. Medical Out-Patients. Dispensary. Fevers.

*Examination in Materia Medica.**Summer Session—*

Operative Surgery.	Maternity Cliniques.
Public Health.	* A. { Ophthalmology.
Forensic Medicine.	{ Diseases of the Skin.
Mental Diseases.	* B. { Clinical Gynæcology.
Clinical Medicine.	{ Larynx, Ear and Nose.
Medical Out-Patients.	* C. Diseases of Children.

Examination in Forensic Medicine and Public Health.

FIFTH YEAR.

First Half of the Winter Session—

Clinical Surgery.

*Examination in Midwifery.**Second Half of the Winter Session—*

Clinical Medicine. Surgical Out-Patients.

*Examination in Systematic Medicine and Surgery.**Summer Session—*

Clinical Medicine or Clinical Surgery.

*Examination in Clinical Medicine, Clinical Surgery, and Clinical Gynaecology.**B.—For Students beginning in Summer.**First Summer Session—*

Botany. Botany (Practical). Zoology. Zoology (Practical).

Examination in Botany and Zoology.

FIRST YEAR.

First Half of the Winter Session—

Chemistry. Chemistry (Practical). Anatomy. Physics.

*Examination in Physics.**Second Half of the Winter Session—*

Chemistry—*continued*. Chemistry (Practical)—*continued*.
 Anatomy (Practical).

*Examination in Chemistry.**Summer Session.*

Anatomy (Practical). Histology.

SECOND YEAR.

First Half of the Winter Session—

Anatomy (Practical). Physiology. Physiology (Experimental).

* May be taken in Fifth Year. These subjects should be taken according to the above grouping, and only one of the groups, A., B., or C. should be taken at a time.

Second Half of the Winter Session—

Anatomy (Senior). Anatomy (Practical). Anatomical Demonstrations.
 Physiology—*continued*. Physiology (Chemical).
Examination in Physiology.

Summer Session—

Anatomical Demonstrations. Anatomy (Practical).
 Pathology (Practical). Surgical Out-Patients.

THIRD, FOURTH, AND FIFTH YEARS.

Same as in the case of students beginning in Winter.

The candidate must attend Hospital for not less than three years; must attend both Clinical Medicine and Clinical Surgery for a period of at least nine months; twenty-five cases of Midwifery, or twelve cases and three months' attendance at a Maternity Hospital; and Post-Mortem Examinations for three months.

It is required that, before commencing the study of Practical Midwifery, every student shall have held the offices of Clinical Medical Clerk and Surgical Dresser, and have attended a Course of Lectures on Surgery and Midwifery.

Two of the five years of study must be spent at the University, and not less than eight of the compulsory subjects of study must be taken in the University.

The minimum expense of M.B. and Ch.B., including fees for Classes, Hospital, Matriculation and Examination, amounts to about £143.

The University degrees are conferred on women students.

A complete curriculum is given by the School of Medicine for Women, Surgeons' Hall.

DEGREE OF M.D.

Each candidate for this degree, under the New Regulations, must be of the age of twenty-four years or upwards, and must have obtained the degrees of M.B. and Ch.B. of the University. He must either have been engaged for two years in general practice, or for one year in the naval or military medical services, or in the medical wards of a hospital, or in scientific research. He must present a thesis written by himself on a medical subject, and pass an examination in Clinical Medicine. In this examination the candidate has to write a report and commentary on at least three cases, and has to show a practical knowledge in the application of the ophthalmoscope, laryngoscope, electrical apparatus, and sphygmograph, in the examination of the blood, and in the chemical and microscopical examination of the excreta.

The candidate who has graduated M.B. and Ch.B. under the old regulations may either proceed to the degree of M.D. under the old regulations (under which he is not required to pass an examination in Clinical Medicine, but must have passed examinations in Greek and in Logic or Moral Philosophy), or he may proceed to the degree as if he had graduated M.B., Ch.B. under the New Regulations.

DEGREE OF CH.M.

Each candidate must be not less than twenty-four years of age, must possess the degrees of M.B., Ch.B., must have attended the surgical wards of a hospital for one year, or have spent one year in scientific research or in the naval or military medical services, or two years in practice other than that restricted to medicine. He must submit a thesis on a surgical subject, and pass an examination on Clinical Surgery and its branches, Surgical Anatomy, and Operations on the Dead Body.

FEES FOR M.D. AND CH.M.

The fee for the M.D. degree under the old regulations is five guineas ; for the M.D. or Ch.M., under the New Regulations, ten guineas. The candidate must have paid the matriculation fee for the year in which he presents himself for examination or graduation. At each reappearance for examination, under the New Regulations, the fee is five guineas.

DEGREES IN PUBLIC HEALTH.

Two degrees are granted by the University of Edinburgh in the department of Sanitary Science, viz., B.Sc. and D.Sc.

BACHELOR OF SCIENCE.

Candidates must be graduates in Medicine of a University of the United Kingdom or of some other recognised University. In order to obtain the degree two examinations have to be passed.

First Examination.—Before entering for this examination the candidate must, after graduating in Medicine, have worked in a recognised Public Health Laboratory for eight months, of which five consecutive months must be passed in the Public Health Laboratory of the University of Edinburgh.

He must also have attended in a Scottish University a course of lectures on Physics and a course of lectures on Geology, extending over three months, and approved of by the University Court.

The subjects of examination are as follows :—

(1) *Laboratory work*—Practical, written and oral ; examination of water, air, foods, beverages, condiments, sewage ; soils ; disinfectants ; building materials ; clothing ; bacteriology.

(2) *Physics.* (3) *Geology.*

Second Examination.—This cannot be taken until eighteen months after graduating in medicine ; nor sooner than six months after passing the First B.Sc. Examination. The candidate must have attended two separate courses on Public Health, either in the University of Edinburgh or in some other recognised University or School.

Each course must consist of forty lectures, and includes Medicine in its relation to Public Health and Sanitary Engineering.

The candidate must likewise produce evidence that (1) for six months he has studied sanitary work under a Medical Officer of Health for a county or burgh of not less than 25,000 inhabitants ; (2) that he has studied clinically for three months infectious diseases in a recognised institution ; (3) that for three months he has been instructed by a recognised teacher in mensuration and drawing.

The subjects of examination are :—

(1) Sanitation ; (2) Sanitary Law ; (3) Vital Statistics ; (4) Medicine in Relation to Public Health.

The candidate is examined orally, practically, and by a written paper. *Sanitation* includes making reports on dwellings, workshops, hospitals and sanitary schemes.

The University Court may modify the work and instruction prescribed from time to time.

DOCTOR OF SCIENCE.

A graduate after having held the degree of B.Sc. for five years may present himself for the D.Sc. He must present a thesis or a published work or memoirs, the result of his own research, and must pass an examination in Public Health, and in such of its special subjects as the Senatus may determine. The candidate must submit the subject in which he proposes to be examined for approval not less than two months before the examination.

FEES PAYABLE.—First and second examinations, £3, 3s. each ; for D.Sc., £10, 10s.

INSTITUTIONS FOR CLINICAL INSTRUCTION IN EDINBURGH.

Royal Infirmary. 860 beds and 40 cots. Fees—perpetual ticket, £12 ; one year, £6, 6s. ; six months, £4, 4s. ; three months, £2, 2s. Clinical instruction is given daily in Medicine, Surgery, and all their special branches.

Royal Hospital for Sick Children. 120 beds. Hospital ticket, £1, 1s. Fee for Qualifying Course, £2, 2s.

City Hospital for Infectious Diseases. 600 beds. Fee, £1, 1s.

Royal Maternity and Simpson Memorial Hospital. 40 beds. The Maternity Residency affords accommodation for twelve students.

Royal Asylum, Morningside. 500 beds.

The fee for a qualifying course at each of these last two institutions is £2, 2s.

Victoria Hospital for Consumption and Diseases of the Chest. 50 beds. Out-Patient Department at 26 Lauriston Place.

Eye, Ear and Throat Infirmary. 6 beds ; 2700 Out-Patients yearly. Fee for three months, £1, 1s.

Royal, New Town, Medical Missionary (Cowgate), Western, Provident (Marshall Street), Eye, and Skin Dispensaries.

PROFESSORS AND LECTURERS IN EDINBURGH.

The courses given by the Extra-Mural Lecturers are recognised by the University and other examining boards as qualifying for graduation.

Botany— Professor Bayley Balfour, M.D., Botanical Gardens.
James A. Terras, B.Sc., New School.

Zoology— Professor J. Cossar Ewart, M.D., University.
Malcolm Laurie, D.Sc., Surgeons' Hall.
Marion I. Newbigin, D.Sc., Surgeons' Hall.

Biology— Malcolm Laurie, D.Sc., Surgeons' Hall.
Marion I. Newbigin, D.Sc., Surgeons' Hall.

Physics— Professor J. G. MacGregor, D.Sc., University.
C. G. Knott, D.Sc., University.
Dawson Turner, M.D., Surgeons' Hall.

Chemistry— Professor Walker, University.
G. H. Gemmell, F.I.C., 4 Lindsay Place.
T. W. Drinkwater, Ph.D., Surgeons' Hall.

Anatomy— Professor A. Robinson, M.D., University.
J. Ryland Whitaker, M.B., Surgeons' Hall.

Applied Anatomy—

H. J. Stiles, M.B., University.
J. Ryland Whitaker, M.B., Surgeons' Hall.

Physiology— Professor E. A. Schäfer, LL.D., University.
Alexander Goodall, M.D., Surgeons' Hall.

Materia Medica and Therapeutics—

Professor Sir Thomas R. Fraser, M.D., University.
William Craig, M.D., Surgeons' Hall.
Francis D. Boyd, C.M.G., M.D., New School.

Pathology— Professor W. S. Greenfield, M.D., University.
Theodore Shennan, M.D., Surgeons' Hall.
James Miller, M.D., New School.

Surgery— Professor Alexis Thomson, University.
J. W. Dowden, F.R.C.S., New School.
A. A. Scot Skirving, C.M.G., F.R.C.S., 27 Nicolson Square.
Henry Wade, F.R.C.S., Surgeons' Hall.
G. L. Chiene, F.R.C.S., Brighton Street.
J. W. Struthers, F.R.C.S., New School.
W. J. Stuart, F.R.C.S., 59 Forrest Road.
Lewis Beesly, F.R.C.S., Surgeons' Hall.

Clinical Surgery—

The Surgeons of the Royal Infirmary.

Practice of Medicine—

Professor J. Wyllie, M.D., University.
J. J. Graham Brown, M.D., New School.
W. Russell, M.D., Surgeons' Hall.
{ Harry Rainy, M.D., 27 Nicolson Square.
{ R. A. Fleming, M.D., 27 Nicolson Square.
 G. Lovell Gulland, M.D., Surgeons' Hall.
{ Byrom Bramwell, M.D., New School.
{ Edwin Bramwell, M.D., New School.

Clinical Medicine—

The Physicians of the Royal Infirmary.

Midwifery and Gynaecology—

Professor Sir J. Halliday Croom, M.D., University.
D. Berry Hart, M.D., Surgeons' Hall.
J. W. Ballantyne, M.D., Surgeons' Hall.
A. H. F. Barbour, M.D., University and Royal Infirmary.
J. Haig Ferguson, M.D., New School.
W. Fordyce, M.D., New School.
N. T. Brewis, F.R.C.S., Royal Infirmary.
J. Lamond Lackie, M.D.
E. M. Inglis, M.B.
John M'Gibbon, M.B., 59 Forrest Road.
G. F. B. Simpson, M.D., New School.
H. S. Davidson, F.R.C.S.

Insanity— G. M. Robertson, M.D., University and Royal Asylum.
{ Sir J. Batty Tuke, M.D., Surgeons' Hall.
{ John Keay, M.D., Bangour Village Asylum.

Diseases of the Eye—

G. Mackay, M.D., Royal Infirmary.
W. G. Sym, M.D., Royal Infirmary.
A. H. H. Sinclair, M.D. (Ophthalmoscopy), 45 Lauriston Place.
J. V. Paterson, M.B., Cambridge Street.

Vaccination— J. B. Buist, M.D., Western and Cowgate Dispensaries.
W. G. Aitchison Robertson, M.D., D.Sc., Royal Dispensary.

Diseases of Children—

Staff of the Sick Children's Hospital.

Diseases of the Skin—

Norman Walker, M.D., Royal Infirmary.
Frederick Gardiner, M.D., Surgeons' Hall.

Diseases of the Ear, Nose and Throat—

A. Logan Turner, M.D., Royal Infirmary.
 J. Malcolm Farquharson, M.B., Royal Infirmary.
 J. S. Fraser, M.B., Surgeons' Hall.

Forensic Medicine—

Professor Harvey Littlejohn, F.R.C.S., University.
 W. G. Aitchison Robertson, M.D., D.Sc., Surgeons' Hall.
 John Macmillan, F.R.C.S.

Public Health—

Professor C. Hunter Stewart, M.B., University.
 W. G. Aitchison Robertson, M.D., D.Sc., Surgeons' Hall.
 Wm. Robertson, M.D., Surgeons' Hall.
 John Macmillan, F.R.C.S.

Fevers—

Alexander James, M.D., City Hospital.
 C. B. Ker, M.D., City Hospital.

Bacteriology—

W. E. Carnegie Dickson, M.D., University.
 T. Shennan, M.D., Surgeons' Hall.
 J. Taylor Grant, M.D., 4 Lindsay Place.
 James Miller, M.D., New School.

Diseases of Tropical Climates—

Major D. G. Marshall, I.M.S., University and Surgeons' Hall.

Practical Medicine and Physical Diagnosis—

G. Lovell Gulland, M.D., Surgeons' Hall.
 R. A. Fleming, M.D., Nicolson Square.
 William Russell, M.D., Surgeons' Hall.

Neurology— J. J. Graham Brown, M.D., New School.*Diseases of the Chest—*

R. W. Philip, M.D., 26 Lauriston Place.
 G. Lovell Gulland, M.D., 26 Lauriston Place.

Medical Electricity and Röntgen Rays—

Dawson Turner, M.D., Surgeons' Hall.

Diseases of the Blood—

G. Lovell Gulland, M.D., Surgeons' Hall.
 Alexander Goodall, M.D., Surgeons' Hall.

Practical Anæsthetics—

D. C. A. McAllum, University.

History of Medicine—

J. D. Comrie, M.B., University.

 GLASGOW UNIVERSITY.

The medical curriculum at the University extends over five years, and the classes are held in the handsome buildings at Gilmorehill, adjacent to which lies the Western Infirmary, where there is an excellent field for clinical and practical work.

The Faculty of Medicine embraces the classes of Botany, Zoology, Physics, Chemistry, Anatomy, Embryology, Physiology, *Materia Medica* and Therapeutics, Pathology, Medical Jurisprudence and Public Health, Surgery, Clinical Surgery, Practice of Medicine, Clinical Medicine, Midwifery, Insanity, Diseases of the Eye, Diseases of the Ear, Diseases of the Throat and Nose, Diseases of the Skin, and Diseases of Children.

The cost of the medical curriculum is about £126.

Before the commencement of medical and surgical studies the preliminary examination has to be passed. The names of candidates for this examination must be given in and the fee of 10s. 6d. paid to the assistant clerk at the Matriculation Office. At the Matriculation Office successful students can obtain the registration forms, which must be filled up and sent to 54 George Square, Edinburgh.

The University of Glasgow offers many attractions to students. The professorial chairs are occupied by able men, some of them of world-wide renown; the laboratories are new and are large and thoroughly equipped; and in the Western Infirmary, with the recent additions to its surgical theatres and its excellent pathological laboratories and museum, a splendid field of observation is open to the student. There are also extremely good opportunities for practical work in the various dispensaries of the city, in the Maternity Hospital with its large outdoor department, and also at the Royal Hospital for Sick Children, the Eye Infirmary, and the Royal Asylum at Gartnavel.

The Students' Union, situated in the University grounds, is very convenient, and much taken advantage of.

Lodgings are to be found all round the neighbourhood, so that the whole life of the student, his work and his recreation, is drawn into a small circle, within which he can move as busily and as profitably to himself as in any teaching school in the kingdom.

QUEEN MARGARET COLLEGE FOR WOMEN.

A full course of medicine and surgery is obtainable partly at Queen Margaret College, but in recent years the tendency has been to have mixed classes at Gilmorehill. The regulations, fees, &c., are similar to those for men. The buildings are pleasantly situated in grounds of their own, close to the Botanic Gardens. The anatomical department is excellently arranged and most complete. Clinical work is amply provided for in the Royal Infirmary and its Dispensaries, and in the Royal Hospital for Sick Children, the Glasgow Maternity Hospital, the Royal Asylum of Gartnavel, and the Belvidere Fever Hospital. There are also arrangements for special study and research.

Students can have board and lodging at Queen Margaret Hall, within easy reach of the College, at the rate of about one guinea per week.

All information necessary can be obtained from Miss Melville, Queen Margaret College, Glasgow.

ST. MUNGO'S COLLEGE.

This, the Medical School of the Royal Infirmary, the largest hospital in Glasgow, is situated in Cathedral Square, Castle Street, and has ear communication with every part of the city. St. Mungo's College is in the Infirmary grounds.

The Infirmary has, including the Ophthalmic Department, over 620 beds, the average number occupied in 1905 being 600. When the reconstruction of the Infirmary, long in progress, is completed, it will have about 700 beds. There are special beds and wards for Diseases of Women, of the Throat, Nose and Ear, Venereal Diseases, Burns, and Septic Cases.

At the Outdoor Department the attendances in 1905 numbered over 62,000. In addition to the large Medical and Surgical Departments, there are Departments for Special Diseases—namely, Diseases of Women, of the Throat and Nose, of the Ear, of the Eye, of the Skin, and of the Teeth. A fully-equipped Electrical Pavilion was opened a few years ago, and year by year the latest and most approved apparatus for diagnosis and treatment has been added. Wards are set apart for the teaching of women students.

Appointments.—Five House-Physicians and nine House-Surgeons, having a legal qualification in Medicine and Surgery, who board in the Hospital free of charge, are appointed every six months. Clerks and Dressers are appointed by the Physicians and Surgeons. As a large number of cases of Acute Diseases and Accidents of a varied character are received, these appointments are very valuable and desirable.

Fees.—The fees for hospital attendance, including Clinical Lectures and Tutorial Instruction, attendance at the Outdoor Department, at the Pathological Department, Post-mortem Examinations, and the use of the Museum, which has not long since been rearranged and catalogued, are as follows:—For one year, £10, 10s.; for six months, £6, 6s.; for three months, £4, 4s. Students who have paid fees to the amount of £21 to the Glasgow Royal Infirmary are permitted to attend, in any subsequent year or years, one Winter and one Summer Course of Instruction in the Infirmary without further payment; and Students who have paid to any other hospital in the United Kingdom fees, being not less than £21, in virtue of which they are entitled to attend without further payment, shall be admitted as Students of the Royal Infirmary on payment of £3, 3s. for six months, or £1, 11s. 6d. for three months.

ANDERSON'S COLLEGE MEDICAL SCHOOL,

DUMBARTON ROAD, PARTICK, GLASGOW.

The old Institution known as "Anderson's University" was founded by the will of John Anderson, M.A., F.R.S., in 1793, and the medical school connected therewith dates back to the year 1799.

In 1877 the name of the Institution was altered from "Anderson's University" to "Anderson's College." In 1887 the medical school of Anderson's College became a distinct Institution known as "Anderson's College Medical School."

The new buildings are situated in Dumbarton Road, immediately to the west of the entrance of the Western Infirmary and four minutes' walk from the University. They are constructed on the best modern principles, and are provided with all the appliances requisite for the conduct and management of a fully-equipped medical school.

Classes are conducted in all the subjects of the five years' curriculum:—

Anatomy—Professor A. M. Buchanan, M.A., M.D.

Physics—Professor Peter Bennett.

Chemistry—Professor J. Robertson Watson, M.A.

Botany—Professor B. G. Cormack, M.A., B.Sc.

Zoology—Professor Geo. Bell Todd, M.B.

Physiology—Professor A. J. Ballantyne, M.D., Ch.B.

Materia Medica—Professor J. P. Duncan, M.B., B.Sc.

Medical Jurisprudence—Professor Cairns Douglas, D.Sc., M.D., F.R.S.E.

Midwifery—Professor J. M. Munro Kerr, M.D., C.M.

Surgery—Professor Geo. H. Edington, M.B.

Practice of Medicine—Professor John Cowan, B.A., D.Sc., M.D.

Ophthalmic Medicine and Surgery—A. Freeland Fergus, M.D., F.R.S.E.

Aural Surgery—James Galbraith Connal, M.B.

Diseases of Throat and Nose—John Macintyre, M.B., F.R.S.E.

Mental Diseases—John Carswell, F.F.P.S.G.

Public Health Laboratory—Professor Carstairs Douglas, D.Sc., M.D., F.R.S.E.

Pathology—At the Western or Royal Infirmary.

Degrees and Diplomas.—Certificates of attendance on the classes at Anderson's College Medical School are received by the Universities of London and Durham, by the Royal University of Ireland, and by all the Royal Colleges and Licensing Boards in the United Kingdom. They are also recognised by the Universities of Glasgow and Edinburgh under certain conditions which are stated in the Calendar of this school. The Public Health Laboratory Course is recognised as qualifying for the Diploma granted by the University of Cambridge, the Scottish Conjoint Board, and the Royal Irish Colleges.

Candidates for the Licence in Dental Surgery can obtain at this school the full medical curriculum which is required. The courses special to dentistry are conducted at the Glasgow Dental School, 15 Dalhousie Street.

Malcolm Kerr Bursary in Anatomy. Value about £10. Open to students of the junior anatomy class during session 1907-1908.

The Carnegie Trust will pay the fees of students at Anderson's, on conditions regarding which particulars may be obtained from W. S. McCormick, LL.D., Carnegie Trust Offices, Edinburgh.

Class Fees.—For each course of lectures (anatomy, ophthalmic medicine and surgery, aural surgery, diseases of throat and nose and mental diseases excepted): first session, £2, 2s.; second session (in Anderson's College), £1, 1s.; afterwards free. For practical classes (except anatomy), viz., chemistry, botany, zoology, physiology, pharmacy, operative surgery: first session, £2, 2s.; second session, £2, 2s.

Reduced joint fees in zoology and in botany, for lectures and practical class when taken in same summer session, £3, 3s.; for either course separately, £2, 2s.

Anatomy Class Fees.—Winter—first session (including practical anatomy), £4, 4s.; second session (including practical anatomy), £4, 4s.; third session, £2, 2s.

Summer—lectures and practical anatomy, £2, 12s. 6d.; lectures alone, £1, 11s. 6d.; practical anatomy alone, £1, 11s. 6d.; osteology and practical anatomy, £2, 12s. 6d.; osteology alone, £1, 11s. 6d.; practical anatomy alone, £1, 11s. 6d.

Ophthalmic Medicine and Surgery (including hospital practice), *Aural Surgery*, *Diseases of Throat and Nose and Mental Diseases*, £1, 1s.

Matriculation Fee.—Winter, 10s. (5s. for a single class); for summer session only, 5s.

ABERDEEN UNIVERSITY.

The course of study for the degree of M.B., Ch.B. extends over five years, of which two at least must be spent in the University of Aberdeen.

The curriculum is the same as in the other Scottish Universities as far as relates to attendance on University classes, to clinical study at a General Hospital, to attendance on courses of Clinical Surgery, Clinical Medicine, Mental Diseases, and Practical Pharmacy, to instruction in Vaccination, to attendance on Cases of Labour, and to the practice of a Dispensary.

The candidate must also, before admission to the final examination, produce the following certificates:—

1. That he has acted as Clerk in the Medical and Dresser in the Surgical Wards of a Public Hospital, each for a period equivalent to one Winter Session.

2. That he has been present at not fewer than twenty-five post-mortem examinations at a Hospital or Dispensary, some of which he must have taken part in performing.

3. That he has attended for at least three months the practice of a General Fever Hospital with not fewer than forty beds.

4. That he has attended for at least three months a course of clinical instruction in the Diseases of Children.

5. That he has attended for at least three months the Ophthalmological practice of a Hospital or Dispensary, where special provision is made for giving instruction.

Certificates for these various classes and courses must attest not only regular attendance, but also due performance of the work.

There is no prescribed order of study, but a scheme, representing the minimum curriculum, has been drawn up for the guidance of students, and is printed in the Calendar.

THE FOLLOWING ARE THE CLASSES IN THE MEDICAL FACULTY :—

WINTER SESSION.

Zoology—Professor John Arthur Thomson, M.A.

Chemistry—Professor Japp, M.A., LL.D., F.R.S.

Anatomy—Professor Reid, M.D., F.R.C.S.

Practical Anatomy—Professor Reid and Assistants.

Physiology (Syst. and Pract.)—Professor MacWilliam, M.D.

Materia Medica—Professor Cash, M.D., F.R.S.

Pathology (Syst. and Pract.)—Professor George Dean, M.B., C.M.

Surgery—Professor John Marnoch, M.A., M.B., C.M.

Medicine—Professor Finlay, B.A., M.D., F.R.C.P.

Midwifery and Diseases of Women and Children—Professor Stephenson, M.D., F.R.C.S.

SUMMER SESSION.

Botany—Professor Trail, M.A., M.D., F.R.S.

Practical Botany—Professor Trail.

Zoology—Professor Thomson.

Practical Zoology—Professor Thomson.

Physics—Professor Niven, M.A., D.Sc., F.R.S.

Practical Chemistry—Professor Japp and Assistants.

Practical Anatomy—Professor Reid and Assistants.

Practical Materia Medica and Pharmacy—Professor Cash and Assistants.

Physiology (Syst. and Pract.)—Professor MacWilliam.

Forensic Medicine—Professor Hay, M.D., LL.D.

Practical Hygiene and Forensic Medicine—Professor Hay.

Pathology (Syst. and Pract.)—Professor Dean.

Practical Midwifery and Gynaecology and Clinical Diseases of Children—Professor Stephenson.

Systematic and Practical Pathology, and Systematic and Practical Physiology respectively are now taught as part of one continuous course, occupying a whole academic year, *i.e.* a summer and a winter session.

There are Assistants to the Professors in the Medical Faculty appointed annually, two in the Department of Anatomy, Physiology, Materia Medica and Chemistry, and one in each of the other departments.

Clinical Medicine and Clinical Surgery are taught by the Physicians and Surgeons of the Royal Infirmary.

The following are recognised as Lecturers :—

Lecturer on Mental Diseases . . .	Wm. Reid, M.D.
„ Ophthalmology . . .	(C. H. Usher, M.B., B.S., F.R.C.S.
„ „ . . .	(A. Rudolph Galloway, M.A., M.B., C.M.
Lecturer on Vaccination . . .	T. Fraser, M.A., M.B., Ch.B.
„ Skin Diseases . . .	J. F. Christie, M.A., M.B., C.M.
„ Diseases of Ear, Throat . . .	J. Mackenzie Booth, M.D., C.M.
„ and Nose . . .	(H. Peterkin, M.B.
„ Medical Electricity . . .	J. R. Levack, M.B., C.M.
„ „ . . .	(A. W. Falconer, M.D.
„ Anaesthetics . . .	(D. W. Geddie, M.B., C.M.

All the University Classes are held at Marischal College.

Tutorial Classes are held in connection with most of the Systematic Courses, and practical instruction is given in the fully-equipped Laboratories connected with the several departments.

Graduates or others desirous of engaging in special study or research may be allowed by the Senatus to work in any of the Laboratories on payment of the usual matriculation fee.

General clinical instruction is obtained in the following Medical Institutions :—

The Royal Infirmary of Aberdeen.

This General Hospital, situated about seven minutes' walk from Marischal College, has been recently constructed on the most modern principles, and is fully equipped with all the requirements for medical work and teaching. It accommodates upwards of two hundred patients: the number of patients admitted during the year 1909 was 3165, and the number of out-patients treated during the same period was 16,796.

Six resident medical officers are appointed annually, three in May and three in September, to hold office for twelve months. Salary, £26, 5s. with board.

Fees.—Perpetual fee to hospital practice, £6, or first year, £3, 10s., second year, £3, afterwards free; clerkship in medicine, £1, 1s.; dressership in surgery, £1, 1s.; pathological demonstrations, £2, 2s. (Special courses of lectures are charged for.)

The Royal Hospital for Sick Children

Is situated about five minutes' walk from Marischal College, and accommodates over 80 patients. The number of patients admitted in 1909 was 734, and the number of out-patients treated 1784. No infectious disease except diphtheria is treated. Each student must act as clerk for six weeks in the medical and surgical wards respectively.

There is one qualified house physician and surgeon (resident) who holds office for six months. Salary at the rate of £25 per annum.

Fee for hospital practice, £2, 2s. first year; subsequent years, £1, 1s.

The Royal Asylum

Is about fifteen minutes' walk from Marischal College. It accommodates over 950 patients, and has been recently fitted up with a fully-equipped hospital and a laboratory.

The senior physician is recognised by the University as lecturer on mental diseases, and delivers a qualifying course of lectures.

The City (Fever) Hospital

Is about ten minutes' walk from Marischal College, and accommodates 100 patients.

Senior students are admitted for instruction in fevers twice a week under the visiting physician (who is the Medical Officer of Health for the City) and his assistant. Fee, £1, 1s.

General Dispensary, Maternity Hospital and Vaccine Institution.

This is about five minutes' walk from Marischal College.

The total number of cases treated during 1909 was 13,930, and the number of patients treated at their own homes 3048. There were 416 midwifery cases.

Fees.—General practice, £3, 3s.; vaccination certificate and instruction, £1, 1s.; Maternity Hospital, £3, 3s.

Ophthalmic Institution.

This Institution is situated about three minutes' walk from Marischal College. The surgeon in charge is recognised by the University as a lecturer on ophthalmology.

During 1903, 50 in-patients and 3680 out-patients were treated.

PROFESSIONAL EXAMINATIONS.

There are four examinations: the subjects and regulations of these are common to the Universities of Aberdeen and Glasgow.

DEGREE OF M.D.

The regulations with regard to the age and other qualifications of the candidate are similar to those in the other Scottish Universities. He must submit a thesis written by himself upon any medical subject, and pass an examination in Clinical Medicine and in such Special Departments of Medicine as he may select.

DEGREE OF CH.M.

Each candidate must be not less than twenty-four years of age, and must hold the degree of M.B., Ch.B. of the University. He must produce a certificate of having been engaged for at least one year in attendance in the surgical wards of a hospital, or in scientific research, or in the naval and military services, or for two years in practice other than practice restricted to medicine. He must present a thesis on a surgical subject and pass an examination on Clinical Surgery, Surgical Anatomy, and Operations on the Dead Body.

DIPLOMA IN PUBLIC HEALTH (D.P.H.).

The diploma is conferred, after special instruction and examination, on any one who has been at least twelve months a graduate in medicine of a University in the United Kingdom; if not a graduate of Aberdeen University, the candidate must attend a course of instruction in this University in one or more subjects embraced in the examination for the diploma.

Each candidate must have attended a course of instruction in Public Health.

The qualifying post-graduate instruction embraces—

- (a) Regular attendance, for three months, at a hospital for infectious diseases, at which opportunities are afforded for the study of methods of administration.
- (b) Daily association for a period of six months (of which at least three months must be distinct from the period of laboratory instruction) in the duty, routine and special, of Public Health Administration, under the supervision of a recognised Medical Officer of Health.
- (c) Practical instruction, for at least six months, in laboratory work, which includes examination of water, air, soil and foods, and the study of bacteriology, disinfection, ventilation, water supply and sewerage, and the framing of reports of analysis. The laboratory attendance must extend over at least fifteen hours a week.

The qualifying courses of laboratory instruction in Aberdeen University are given in the Public Health Laboratory (Fee, £6, 6s.), and the Bacteriological Laboratory (Fee, £4, 4s.).

Instruction is given in the Drawing and Interpretation of Plans (Fee, £1, 1s.).

The diploma is conferred after an examination in March and July of each year.

The examination is written, oral and practical, and is divided into two parts.

Part I. embraces the following subjects in their application to Public Health:—

- (a) Physics, Engineering and Meteorology.
 (b) Chemistry, Microscopy and Bacteriology.

Part II. embraces—

- (a) General Hygiene.
 (b) Sanitary Law and Vital Statistics.

Part I. may be taken alone, or both parts together.

The written examinations occupy two days, and the oral and laboratory, and outdoor examinations three to four days.

Candidates must send in their names and pay the fees a fortnight before the examination. Examination Fee is five guineas. Re-examination fee one guinea.

SUMMARY OF FEES.

I. UNIVERSITY FEES.

(a) Preliminary Examination (each occasion)	.	.	.	£0	10	6	
(b) Matriculation—For whole year	.	.	.	1	1	0	
For Summer Session	.	.	.	0	10	6	
(c) Class Fees—							
Each Systematic Course—For Winter or Full Course	.	.	.	4	4	0	
Each subsequent attendance	.	.	.	3	3	0	
For Summer or Half Course	.	.	.	3	3	0	
Each subsequent attendance	.	.	.	3	3	0	
Each Practical Course and subsequent attendance	.	.	.	3	3	0	
Except { Practical Anatomy in Summer	.	.	.	2	2	0	
{ Practical Midwifery	.	.	.	2	2	0	
(d) Degree Fees—For M.B., Ch.B.—							
1st Professional Exam.	.	.	.	£5	5	0	
2nd " "	.	.	.	5	5	0	
3rd " "	.	.	.	5	5	0	
4th " "	.	.	.	7	7	0	
					23	2	0
Re-examination Fee for not more than two subjects	.	.	.	1	1	0	
for each additional subject	.	.	.	0	10	6	
For M.D.	.	.	.	10	10	0	
For Ch.M.	.	.	.	10	10	0	
Re-examination Fee	.	.	.	2	2	0	

II. NON-UNIVERSITY FEES.

Royal Infirmary—Perpetual Fee	.	.	.	.	6	0	0
Children's Hospital	.	.	.	.	2	2	0
Dispensary—Perpetual Fee	.	.	.	.	3	3	0
City (Fever) Hospital	.	.	.	.	1	1	0
Lectures on Clinical Medicine—Winter Session	.	.	.	.	4	4	0
" " " Summer "	.	.	.	.	3	3	0
" Clinical Surgery—Winter Session	.	.	.	.	4	4	0
" " " Summer "	.	.	.	.	3	3	0
Clerkship at Royal Infirmary	.	.	.	.	1	1	0
Dressership " "	.	.	.	.	1	1	0
Course of Lectures on { Mental Diseases							
{ Diseases of Eye							
{ Diseases of Ear and Throat							
{ Diseases of Skin							
{ Clinical Gynæcology	.	.	.	Each	2	2	0
{ Medical Electricity							
Instruction in { Anæsthetics							
{ Dental Surgery							
{ Post-Mortem Room							
Instruction in Vaccination	.	.	.	.	1	1	0

The cost of matriculation, class and hospital fees for the whole curriculum, exclusive of fees for degrees, is usually about £120.

UNIVERSITY OF ST. ANDREWS.

The medical degrees are the same as those of Glasgow and Aberdeen Universities, and they are granted under similar conditions. The graduation fees for the degree of M.B., Ch.B. amount to twenty-two guineas, and for M.D. or Ch.M. ten guineas.

United College, St. Andrews, affords considerable facilities to students beginning a medical course, especially if they are willing to combine it with a preliminary two years of study for an Arts or Science degree. Under the New Regulations, which make it possible to study botany, zoology, chemistry, and physics as part of the course for an M.A. degree, the medical student can, during the early years of his medical course, hold some of the many bursaries or scholarships which the University of St. Andrews has to offer. For women, the large number of Taylour Thomson bursaries makes the course at St. Andrews specially advantageous. The cost of rooms and living is considerably under that in the larger towns. For women there is an excellent residential hall, and other students may attend the common dinners in the Union. The medical course in St. Andrews extends over two years, and embraces all the subjects (except *materia medica*) of the first two professional examinations. The other subjects must be taken at the Conjoint School of Medicine, Dundee, or elsewhere. There are special buildings for the Medical School.

The Conjoint School of Medicine, University College, Dundee, supplies a complete course of medical study, whether the student graduate at the University (St. Andrews) or not. Several bursaries are offered for competition among the medical students. Large and commodious new buildings for this medical school, with well-equipped laboratories and dissecting-room, afford ample scope for study. Besides the supervision of individual students which larger schools cannot offer, there are unrivalled opportunities for clinical and out-patient work in the Royal Infirmary.

This Institution is provided with over 300 beds, including special wards for obstetrics, gynecology, children's diseases, ophthalmology, diseases of the skin, and ear, throat and nose, and incipient insanity.*

In addition to this, a large new building, primarily intended for those suffering from cancer not past the operative stage, provides an additional 120 beds and quarters for special research, with an electrical department. There is a large outdoor maternity department, and there are dispensaries which are largely attended in the various districts of the city.

Hospital Fees—Surgical and Medical, £3, 3s. yearly; £1, 1s. quarterly; Perpetual Ticket, £10, or in instalments, £10, 10s.; Obstetric, £2, 2s.

The large asylum at Liff provides material for instruction in mental diseases, and the epidemic hospital for that in fevers. There is also the Royal Victoria Hospital, where patients suffering from incurable diseases can be visited.

UNITED COLLEGE, ST. ANDREWS.

PROFESSORS AND LECTURERS.

Physics— Professor Butler.

Chemistry—Professor Irvine.

Zoology— Professor Mackintosh.

Botany Lecturer—

Mr. R. A. Robertson.

* In all departments the clinical material is equally available for men and women students.

- Physiology, Histology and Physiological Chemistry*—
Professor Herring.
Anatomy and Embryology—
Professor Musgrove and Dr. Robertson.

UNIVERSITY COLLEGE, DUNDEE.

PROFESSORS AND LECTURERS.

- Physics*— Professor Peddie.
Chemistry—Professor Hugh Marshall.
Zoology— Professor D'Arcy W. Thompson, C.B.
Botany— Professor Geddes.
Physiology—
Professor Waymouth Reid.
Anatomy— Principal Yule Mackay and Lieut.-Col. Lamont.
Surgery, Systematic and Operative—
Professor MacEwan.
Surgery, Clinical—
Professor MacEwan.
Mr. D. M. Greig.
Medicine, Systematic—
Professor Stalker.
Medicine, Clinical—
Professor Stalker.
Dr. Mackie Whyte.
Materia Medica—
Professor Marshall.
Pathology—
Professor Sutherland.
Midwifery and Diseases of Women—
Professor Kynoch.
Midwifery and Diseases of Women, Clinical—
Professor Kynoch.
Dr. R. C. Buist.
Forensic Medicine—
C. Templeman, M.D., D.Sc., M.O.H.
Ophthalmology—
A. MacGillivray, M.D.
Diseases of Children—
Mr. D. M. Greig.
Dr. J. S. Y. Rogers.
Diseases of the Skin—
Dr. W. E. Foggie.
Mental Diseases—
J. Rorie, M.D.
W. T. Mackenzie, M.D.
Diseases of Ear and Throat—
G. T. Guild, M.B.
Vaccination—
R. C. Buist, M.D.
Clinical Pathology—
Dr. F. Milne. *

QUALIFICATIONS GIVEN BY THE SCOTTISH COLLEGES.

The Royal College of Physicians of Edinburgh, the Royal College of Surgeons of Edinburgh, and the Royal Faculty of Physicians and Surgeons of Glasgow, conjointly confer the Triple Qualification (L.R.C.P.E., L.R.C.S.E., L.F.P.S.G.). Female candidates are admitted to the examinations for this qualification.

PRELIMINARY EXAMINATION.—This examination must be passed before the student commences professional study. It may be passed before any of the Boards recognised by the General Medical Council, and enumerated in the Regulations of the Colleges. The Educational Institute of Scotland conducts a qualifying Preliminary examination for medical students, in Edinburgh and Glasgow, on behalf of the Colleges. This examination embraces English, Latin, Mathematics, and either Greek, French, German, Italian, or other modern language. All the subjects must be passed at one time. Calendar, containing examination papers, can be had from S. M. Murray, Esq., 34 North Bridge, Edinburgh. Price 1s.

PROFESSIONAL EDUCATION.—The curriculum must extend over five years. Graduates in Arts or Science of any recognised University who have spent a year in the study of Physics, Chemistry, and Biology, and have passed an examination in these subjects for the degrees in question, are exempted from the first year of study. The fifth year of study should be devoted to clinical work in one or more recognised Hospitals or Dispensaries, and to the study of special diseases. For information regarding the payment of class fees by the Carnegie Trust, *vide*, p. 341.

ORDER OF STUDY WHICH IS RECOMMENDED.

First Summer.— Physics and Elementary Biology.

First Winter.— Five months' course in Chemistry and Anatomy; three months' course in Practical Chemistry; Practical Anatomy.

Second Summer.— Practical Anatomy; Practical Physiology.

Second Winter.— Practical Anatomy; Physiology—Five months' course.

Third Summer.— Three months' course in Pathology, Materia Medica, and Practical Materia Medica; Surgical Hospital Practice.

Third Winter.— Six months' course in Surgery and Clinical Surgery; Attendance at Surgical Wards; Pathology.

Fourth Summer.— Three months' course in Midwifery and Gynaecology, in Medical Jurisprudence and Public Health, and in Clinical Surgery; Hospital Practice.

Fourth Winter.— Six months' course in Medicine and Clinical Medicine; Hospital Practice.

Fifth Summer.— Three months at Clinical Medicine; Hospital; Insanity; Diseases of Children; Diseases of Eye.

Practical Midwifery—Personal attendance on twelve cases under the supervision of a medical practitioner, or three months' attendance at a Lying-in Hospital and personal attendance on six cases.

Fifth Winter.— Hospital Practice; Fevers; Dispensary; Vaccination; Skin Diseases; Ear and Throat Diseases; Eye Diseases; Operative Surgery.

PROFESSIONAL EXAMINATIONS.—Four of these are held during the curriculum. Each is held quarterly in Edinburgh and twice a year in Glasgow. Candidates may go up for all the subjects of the first Professional examination at once, or may enter for and pass in any division of subjects. A higher standard is expected, however, from candidates entering for such divisions. Candidates are advised to enter for the entire examination: this is especially the case in the final examination.

First Examination.—Physics, Chemistry and Elementary Biology. This should be passed before the beginning of the second winter session.

Second Examination.—Anatomy, Physiology, including Histology. This should be passed at the end of the second year of study.

Third Examination.—Pathology, Materia Medica and Pharmacy. This should be taken at the end of the third year.

Final Examination.—Can only be taken at the end of the fifth year. The candidate must have attained the age of twenty-one.

It includes—

1. Medicine, Therapeutics, Medical Anatomy, Clinical Medicine.
2. Surgery, Surgical Anatomy, Clinical Surgery, Diseases of the Eye.
3. Midwifery and Diseases of Women and New-born Children.
4. Medical Jurisprudence and Public Health.

(May be taken at any time after the Third Examination.)

FEES FOR PROFESSIONAL EXAMINATIONS.

For each of the first three, £5; for the final, £15. The minimum total expense, inclusive of fees for classes and examinations, amounts to £115.

DIPLOMA IN PUBLIC HEALTH OF THE ROYAL COLLEGES.

The Diploma is granted by the Triple Qualification Board.

1. Every candidate for examination must have held a registrable medical qualification for one year.

2. After obtaining such qualification he must have attended during six months a recognised Laboratory in which Chemistry, Bacteriology, and the Pathology of the Diseases of Animals transmissible to man are taught; and the certificate must show that the candidate has conducted analyses of air, water, sewage and foods.

3. After obtaining a medical qualification he must during six months have been engaged in acquiring a practical knowledge of the duties of Public Health Administration, under the supervision of—

(a) In England or Wales, the Medical Officer of Health of a County or single sanitary District having a population of not less than 50,000, or a Medical Officer of Health devoting his whole time to Public Health work; or

(b) In Scotland or Ireland the Medical Officer of Health of a County or District or Districts with a population of not less than 30,000; or

(c) A Medical Officer of Health who is also a teacher in the Department of Public Health in a recognised medical school.

(d) A Sanitary Staff Officer of the Royal Army Medical Corps having charge of an Army Corps, District or Command, recognised for the purpose by the General Medical Council.

4. After obtaining a medical qualification he must have attended for three months the practice of a Hospital for Infectious Diseases.

There are *Two Examinations*. The first includes—(a) Laboratory work, with Chemistry and Bacteriology; (b) Physics; (c) Meteorology.

The Second Examination embraces—(a) Report on premises visited; (b) Examination at Fever Hospital; (c) Examination at Public Abattoir; (d) Epidemiology and Endemiology; (e) Vital Statistics and Sanitary Law; (f) Practical Sanitation.

Each examination is held bi-annually, in October and May. The fee for each is £6, 6s.; for re-examination, £3, 3s. Fees and applications to be lodged with Mr. James Robertson, 54 George Square, Edinburgh; or with Mr. Alex. Duncan, LL.D., 242 St. Vincent Street, Glasgow.

MEMBERSHIP AND FELLOWSHIP OF THE ROYAL COLLEGE OF PHYSICIANS, EDINBURGH.

Every applicant for the *Membership* must possess a recognised qualification, and be not less than twenty-four years of age. He must pass an examination on Medicine and Therapeutics, on Clinical Medicine, and on some Special Department of Medicine, such as Psychological Medicine, Pathology, Medical Jurisprudence, Public Health, Midwifery, Gynaecology, Neurology, Diseases of Children, Tropical Medicine, &c. The Membership is conferred by election.

The fee for the Membership is thirty-five guineas, except the applicant be a Licentiate of the College, when it is twenty guineas.

Members of not less than three years' standing may be raised by election to the *Fellowship*, the fee being thirty-eight guineas, exclusive of Stamp Duty of £25.

FELLOWSHIP OF THE ROYAL COLLEGE OF SURGEONS, EDINBURGH.

Every candidate must be twenty-five years of age, and must have been engaged for two years in the practice of his profession, after having obtained a recognised qualification in Surgery. The petition for examination must be signed by two Fellows—a proposer and seconder.

The candidate must pass an examination on Surgery, Surgical Anatomy, Clinical Surgery, and one optional subject, for example, Ophthalmology, Aural, Nasal and Laryngeal Surgery, Dental Surgery, Advanced Anatomy or Physiology, Surgical Pathology, Operative Surgery and Morbid Anatomy, Midwifery, Gynaecology, Pathology and Bacteriology, Medical Jurisprudence and Public Health.

The fees amount to £45. If the candidate be a Licentiate of the College the fee is £30. Further particulars may be obtained from the Clerk to the College, 54 George Square, Edinburgh.

FELLOWSHIP OF THE FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

Every candidate must have been qualified for two years, and be aged twenty-four. Admission to the Fellowship is by examination and subsequent election. The candidate is examined on either (*a*) Medicine (including Clinical Medicine, Medical Pathology, and Therapeutics), or (*b*) Surgery (including Clinical Surgery, Operative Surgery, Surgical Anatomy, and Surgical Pathology); and on one optional subject—Anatomy, Physiology, Pathology, Midwifery, Diseases of Women, Medical Jurisprudence, Ophthalmic Surgery, Aural, Laryngeal and Nasal Surgery, Dental Surgery, State Medicine, Psychological Medicine or Dermatology.

The fee is £30, except the candidate be a Licentiate of the Faculty, when it is £15.

MEDICAL EDUCATION OF WOMEN IN EDINBURGH.

SCHOOL OF MEDICINE FOR WOMEN, SURGEONS' HALL.

The courses of instruction given in this School qualify for graduation in Medicine. The curriculum and class fees are the same as for male students proceeding to the University Degree or College Qualification respectively. Clinical tuition is provided in the Royal Infirmary and Sick Children's Hospital.

The prospectus of the College, and any information regarding the medical education of women in Edinburgh, may be obtained from the Secretary, Dean's Office, School of Medicine for Women, Surgeons' Hall, Edinburgh.

POST-GRADUATION STUDY.

The different University Laboratories provide facilities for research work. In most cases no fees are charged, but those engaged in research work are expected to defray the expense of materials. The Laboratory of the Royal College of Physicians of Edinburgh is splendidly equipped for the carrying out of all branches of medical research. It is available for research work to Members and Fellows of the Royal Colleges of Edinburgh and to other applicants approved by the Council of the Royal College of Physicians. No fees are charged, and the ordinary reagents, &c., are provided. By arrangement with the Superintendent, workers may have the assistance of members of the Laboratory Staff. Special post-graduate courses may be arranged.

EDINBURGH POST-GRADUATE VACATION COURSES IN
MEDICINE.

These classes are arranged by a Committee appointed by the University and the School of Medicine of the Royal Colleges. The chief course is held in September.

The composite fee for the Four Weeks' Course is Five Guineas, or Three Guineas for either the first or second fortnight. A special additional fee of One Guinea is charged for each of the following practical classes, in which the accommodation is limited, viz.:—Diseases of the Blood (elementary and advanced); Bacteriology (elementary and advanced); Gastric Methods; Pathological Methods; Ophthalmoscopy; Errors of Refraction; Diseases of the Ear, Nose and Throat; X-Ray and Electrical Work.

A class of Operative Surgery, limited to twenty, may be attended. The fee is Five Guineas in addition to the composite fee.

The other classes include:—Applied Anatomy, Anæsthetics, Modern Bacteriological Research in relation to Practical Medicine, Dietetics, Diseases of the Heart, Infant Feeding, Pathological Methods, Surgical Pathology, Examination of the Urine, as well as Clinical Lectures and Demonstrations in Medicine, Surgery, and all the special departments.

In addition to these courses the classes throughout the year on Bacteriology, Diseases of the Blood, Diseases of the Tropics, Neurology, &c., are usually attended by a considerable number of graduates.

GLASGOW ROYAL INFIRMARY AUTUMN POST-GRADUATE
CLASSES.

These include Demonstrations on Diseases and Injuries of the Eye, Surgical Diseases of the Kidneys and Bladder, Clinical Medicine, Clinical Surgery, Diseases of the Ear, Diseases of Throat and Nose, Hæmatology, Gynæcology, Practical Pathology and Bacteriology.

Those desirous of attending any of the classes are requested to communicate with Dr. Thom, Superintendent, Royal Infirmary, from whom a syllabus may be obtained.

THE ROYAL NAVY MEDICAL SERVICE.

A CANDIDATE must be between 21 and 28 years of age. He must declare: (1) his age, and date and place of birth; (2) that he is of pure European descent, the son either of natural-born British subjects or of parents naturalised in the United Kingdom; (3) that he labours under no mental or constitutional weakness; (4) that he is ready to engage for general service

at home or abroad; (5) that he is registered under the Medical Acts as duly qualified professionally, and what diplomas, &c., he holds. Copies of the Regulations for the entry of candidates for commissions will be furnished on application to the Medical Director-General, Admiralty, 18 Victoria Street, London, S.W.

The entrance examination consists of two parts. Part I.—*Compulsory* (*a*) Medicine (including Materia Medica, Therapeutics and Hygiene), 1200 marks; (*b*) Surgery and Surgical Anatomy, 1200 marks. A competent knowledge of Operative Surgery is essential. Part II.—*Voluntary*—consisting of two divisions: (*a*) French and German (300 marks each); (*b*) Natural Sciences—not more than two of the following subjects—Zoology, Botany, Chemistry, Physiology, Geology and Physical Geography (300 marks each).

Successful candidates, immediately after passing this examination, will receive commissions as surgeons in the Royal Navy, and will undergo a course of practical instruction in Naval Hygiene, the diseases of warm climates, &c., at Haslar Hospital.

Full Pay (yearly).—Surgeon (on entry), £255, 10s.; after four years' full-pay service, £310, 5s.; after eight years' full-pay service, or on promotion to Staff-surgeon, £363; after twelve years' service, £438; Fleet-surgeons (on promotion), £492, 15s.; after four years' full-pay service in that rank, £547, 10s.; after eight years' full-pay service, £602, 5s.; after twelve years' service, £657; Deputy Inspector-General, £766, 10s.; Inspector-General, £1300.

Allowances.—The senior medical officer of ships bearing the flag of flag officers commanding foreign stations and the Channel receives an allowance of 5s. a day. An allowance of 2s. 6d. a day may be granted to the senior medical officer of ships bearing the flag of flag officers not commanding stations or fleets and to ships flying the broad pennant of commodores. Medical officers conducting the course of instruction at Haslar Hospital receive the following allowances:—The two senior officers employed on this duty, £150 a year each; the junior officer assisting, £50 a year; the junior officer instructing the sick berth staff, £50 a year. The following charge allowances may be granted to medical officers in charge of hospital ships: If above the rank of Fleet-surgeons, 5s. a day; if of the rank of Fleet-surgeon or junior, 3s. 6d. a day. Hospital allowances for naval medical officers at home and abroad, in lieu of provisions for themselves and servants, and for fuel and lights, are as follows:—Deputy Inspector-Generals, at home, £67; abroad, £112; Fleet or Staff-surgeons, at home, £53; abroad, £112; Surgeons, at home, £39; abroad, £108.

Half Pay (per diem).—Surgeons under two years' full-pay service, 6s.; after two years' full-pay service, 7s.; after four years' full-pay service, 8s.; after six years, 9s.; after eight years, 10s.; after ten years, 11s. Staff-surgeon on promotion, 12s.; after fourteen years, 13s.; after sixteen years, and on promotion to Fleet-surgeon, 14s.; after eighteen years, 15s.; after twenty years, 17s.; after twenty-two years, 18s.; and after twenty-four years, 20s. Deputy Inspector-General on promotion, 25s.; after two years' full-pay service in rank, 27s.; after four years, 29s. Inspector-General, 38s.

Every medical officer will be required to undergo a post-graduate course of three months' duration at a metropolitan hospital once in every eight years. While carrying out this course, he will be borne on a ship's book for full pay and will be granted lodging and provision allowances and travelling expenses. The fees for each course (not exceeding £25) will be paid by the Admiralty. The medical officer will be required to produce separate certificates of efficient attendance in (1) the medical and surgical practice of the hospital; (2) a course of operative surgery on the dead body; (3) a course of bacteriology; (4) a course of ophthalmic surgery, particular attention being paid to the diagnosis of errors of refraction; (5) a practical course of skiagraphy.

ROYAL ARMY MEDICAL CORPS.

The conditions of service are as follows :—

A candidate for a commission must be 21 years of age, and not over 28 years of age, at the date of commencement of the entrance examination. He must possess a registrable qualification to practise. Regulations, forms of application, and declaration may be obtained on application to the Director-General, Army Medical Service, 68 Victoria Street, London, S.W. The Dean of the candidate's medical school will be requested to render a confidential report as to the candidate's character, conduct, professional ability and fitness, and to this report special importance will be attached. The candidate may subsequently be allowed to compete for a commission, having been previously examined as to physical fitness by a Medical Board.

The *Entrance Examination* held twice a year, usually in January and July is of a clinical and practical character, partly written, and partly oral, marks being allotted under the following scheme :—

MEDICINE (written).				Maximum Marks.
A.	Examination and report upon a medical case in the wards of a hospital .	.	.	125
B.	Commentary upon a case in medicine .	.	.	125
MEDICINE (oral).				
A.	Clinical cases ; clinical pathology .	.	.	75
B.	Morbid anatomy and morbid histology .	.	.	75
SURGERY (written).				
A.	Examination and report upon a surgical case in the wards of a hospital .	.	.	125
B.	Commentary upon a case in surgery .	.	.	125
SURGERY (oral).				
A.	Clinical cases, including diseases of the eye ; surgical instruments and appliances .	.	.	75
B.	Operative surgery and surgical anatomy .	.	.	75
Total marks .				800

Having gained a place in this entrance examination, the successful candidates will undergo two months' instruction in hygiene and bacteriology, after which they will be examined in these subjects. On completion of this course, lieutenants on probation will proceed to the Depot of the Royal Army Medical Corps at Aldershot for a three months' course of instruction in the technical duties of the Corps, and at the end of the course will be examined in the subjects taught.

EXAMINATIONS FOR PROMOTION.

Lieutenants before promotion to Captains (for Lieutenants appointed after 31st March 1901). This examination may be taken at any time after completing eighteen months' service. The subjects of the examination are : (1) Regimental duties ; 2 drill ; 3 military law ; 4 duties and accounts connected with military hospitals and their supplies ; (5) other duties of executive medical officers.

Captains before promotion to Majors (for Captains promoted to that rank after 27th July 1895). This examination may be taken at any time after completing five years' service, after terminating a period of special study. The subjects of the examination are : medicine, including specific fevers, surgery, including skiagraphy, hygiene, bacteriology, and tropical diseases, and one special subject from the subjoined list, to which additions may from time to time be made—bacteriology (including the preparation of antitoxins), dental surgery,

	Daily.
	£ s. d.
Surgeon-General	2 0 0
Colonel	1 15 0
Lieutenant-Colonel, or Surgeon-Lieutenant-Colonel of the Household Troops—	
After 20 years' service	1 0 0
„ 25 „ „	1 2 6
„ 30 „ „	1 5 0
Lieutenant-Colonel, after having been in receipt of the increased pay (5s. a day) for 3 years; or Brigade-Surgeon-Lieutenant-Colonel of the Household Troops—	
Under 30 years' service	1 7 6
After 30 „ „	1 10 0
Major, or Surgeon-Major of the Household Troops—	
After 20 years' service	1 0 0
After 25 years' service, if his service reckoning for promotion is insufficient to qualify him for promotion to the rank of Lieutenant-Colonel	1 2 6
Major or Captain—	Gratuity.
After 5 years' service in the rank of Captain	£1000
After 10 years' service, if the officer was commissioned before the date of the Warrant	1250
After 3 years' service in the rank of Major	1800
„ 6 „ „ „	2500
Surgeon-Lieutenant-Colonel or Surgeon-Major of the Household Troops—	
After 15 years' service	1800
„ 18 „ „	2500
Retirement shall be compulsory at the following ages :—	
Surgeon-General	60
Colonel, promoted to the rank on or after the date of the Warrant	57
Colonel, promoted to the rank before the date of the Warrant	60
Other Officers	55

CANDIDATES must be natural-born subjects of His Majesty, of European or East Indian descent, between 21 and 28 years of age at the date of the examination, of sound bodily health, and in the opinion of the Secretary of State for India in Council, in all respects suitable to hold commissions in the Indian Medical Service. The candidate must show proof of age, a recommendation to the effect that he is of regular and steady habits, a certificate of moral character, certificate of registration under the Medical Acts, a certificate of having attended a course of instruction for not less than three months at an ophthalmic hospital, or the ophthalmic department of a general hospital.

The physical fitness of each candidate will be determined by a Board of Medical Officers.

On proving possession of the foregoing qualifications, the candidate will be examined in the following subjects :—

	Maximum Marks obtainable.
1. Medicine, including Therapeutics	1200
2. Surgery, including Diseases of the Eye	1200
3. Applied Anatomy and Physiology	600
4. Pathology and Bacteriology	900
5. Midwifery and Diseases of Women and Children	600
6. Chemistry, Pharmacy, and <i>either</i> Botany <i>or</i> Zoology	600

After passing this examination, the successful candidate will be required to attend one entire course of practical instruction of not less than four months' duration at the Army Medical School and elsewhere in (1) Hygiene; (2) Clinical and Military Medicine; (3) Clinical and Military Surgery; (4) Pathology of Diseases and Injuries Incidental to Military Service. During the period of instruction each candidate will receive an allowance of 14s. per diem, with quarters, or with the usual allowances of a subaltern in lieu thereof. At the conclusion of the course, candidates will be required to pass an examination in the subjects taught during the course.

PAY AND PROMOTION.

The rate of pay drawn by a Lieutenant previous to arrival in India is 14s. a day, but a Lieutenant who has been permitted by the Secretary of State to hold a hospital appointment will receive no pay while holding it.

A Lieutenant may be promoted to Captain on completion of three years' full-pay service from date of first commission; but after completing eighteen months' service, and before promotion to the rank of captain, he will be required to pass an examination in military law and military medical organisation, the result of which may affect his promotion.

A Captain is promoted to Major on completion of twelve years' full-pay service.

A Major is promoted to Lieutenant-Colonel on completion of twenty years' full-pay service.

All promotions from the rank of Lieutenant-Colonel to that of Colonel, and from the rank of Colonel to that of Surgeon-General are given by selection for ability and merit.

PAY.

The following are the monthly rates of Indian pay drawn by Officers of the Indian Medical Service from the date of their arrival in India:—

Rank.	Unemployed Pay.	Grade Pay.	Staff Pay.	In Officiating Medical Charge of a Regiment.	In Permanent Medical Charge of a Regiment.
	Rs.	Rs.	Rs.	Rs.	Rs.
Lieutenant	420	350	150	425	500
Captain	475	400	150	425	550
" after 5 years' service	475	450	150	545	600
" after 7 years' service	—	500	150	575	650
" after 10 years' service	—	550	150	625	700
Major	—	650	150	725	800
" after 15 years' service	—	750	150	825	900
Lieutenant-Colonel	—	900	350	1075	1250
" " after 25 years' service	—	900	400	1100	1300
Lieutenant-Colonel specially selected for increased pay	—	1000	400	1200	1400

The principal administrative appointments are held by Colonels and Surgeon-Generals on the following consolidated salaries:—

Colonels, from Rs. 1800 to Rs. 2250 per mensem.

Surgeon-General 2 @ Rs. 2200 "

" 2 @ Rs. 2500 "

" 1 @ Rs. 3000 "

Specialist pay at the rate of Rs. 60 a month is granted to officers below the rank of Lieutenant-Colonel who may be appointed to certain posts.

The salaries of other substantive medical appointments in the Civil and Military Departments are consolidated, and vary from Rs. 400 to Rs. 1800 per annum.

Qualified Officers of the Medical Service are also eligible for appointments in the Assay Department. The salaries of these appointments are from Rs. 600 to Rs. 2250 per mensem.

Officers are required to perform two years' regimental duty in India before they can be considered eligible for civil employment.

Except in the administrative grades, and in certain special appointments, medical officers are not debarred from taking private practice. No officer, however employed, can receive any staff allowance unless he has passed the examination in Hindustani known as the "Lower Standard."

Retiring Pensions and Half-Pay.

Officers of the Indian Medical Service may retire on the following scale of pension :—

					Per Annum.
After 30 years' service for pension	.	.	.	.	£700
" 25 " " "	.	.	.	.	500
" 20 " " "	.	.	.	.	400
" 17 " " "	.	.	.	.	300

All officers of the rank of Lieutenant-Colonel and Major are placed on the Retired List when they have attained the age of 55 years, and all Surgeon-Generals and Colonels when they have attained the age of 60 years.

Officers placed on temporary or permanent half-pay are granted the British rate of half-pay of their military rank as under :—

RANK.	RATES OF HALF-PAY.					
	Per Diem.		Per Annum.			
	s.	d.	£	s.	d.	
Lieutenant-Colonel	11	0	200	15	0	
Major	9	6	173	7	6	
Captain	7	0	127	15	0	
Lieutenant	3	0	54	15	0	

MEDICAL APPOINTMENTS IN THE COLONIES.

APPLICANTS for medical appointments in British Guiana, Jamaica, Trinidad and Tobago, Windward Islands, Leeward Islands, British Honduras, Fiji, Ceylon, Straits Settlements, Sierra Leone, Gambia, Gold Coast, Lagos, Northern and Southern Nigeria, Malay States, Hong Kong, Mauritius, Seychelles, Gibraltar, Cyprus, St. Helena and the Falkland Islands, must be between 23 and 30 years of age, must be doubly qualified, and preference will be shown towards those who have held resident hospital appointments. Applications for medical appointments should be sent to the Assistant Private Secretary, Colonial Office.

Information regarding medical appointments in Cape Colony and Natal can be obtained on application to the Agent-General to the Cape, 100 Victoria Street, London, S.W., and the Agent-General for Natal, 26 Victoria Street, London, S.W.

Medical appointments in Rhodesia are made by the British South Africa Company, 2 London Wall Buildings, E.C. ; those in the Transvaal and Orange River Colonies are made on the recommendation of the Governors of these Colonies.

RECENT LITERATURE.

CRITICAL SUMMARIES AND ABSTRACTS.

MEDICINE.

By JOHN D. COMRIE, M.A., B.Sc., M.B., F.R.C.P.,
Lecturer on History of Medicine, University of Edinburgh.

LEVULOSURIA AS A TEST.

It is always interesting and valuable to obtain some new test for the functions of the principal abdominal organs, like the liver and pancreas, since the ordinary clinical means at our disposal for diagnosing with certainty their pathological condition are relatively slight. In the lævulose test we have a recently devised method, easy of application, which appears to be helpful in giving an answer as to the functional activity of the liver cells. Hamilton¹ describes the results of its use in a number of suspected liver cases, and gives a résumé of all the cases recorded up to the end of last year. The test is based upon the following facts :—(a) The liver, as shown experimentally by Sachs, is the only organ capable of dealing with lævulose so as to convert it into glycogen; (b) if a quantity of lævulose (100 grammes) be taken by a healthy individual, it is, in most cases, completely assimilated by the system, and no trace is found in the urine; if, however, the liver be diseased, lævulose is readily discovered in that excretion. The application of the test is very simple. The patient, after a night's fast and after emptying the bladder, receives 100 grammes of lævulose in weak tea or in water, and a specimen of the urine is collected thereafter every hour for four hours and examined by reduction tests, the polariscope or fermentation, as preferred. The value of the test in diagnosing "hepatic insufficiency" will be seen from the following table, which gives the sum of the cases recorded of its use to the end of 1909 :—

	Cases.	Positive.	Negative.
Liver Cirrhoses	102	93	9
Catarrhal Jaundice	9	7	2
Jaundice with Gall-Stones . . .	3	2	1
Luetic Liver	16	11	5
Chronic Obstruction of Common Duct	8	8	0
Passive Liver Congestion	23	1	22

ALBUMIN TESTS.

Although there are many excellent tests in existence for the detection of albumin in the urine, *Oguso's Iodine Test*² appears to be worthy of attention. The solutions required are a 10 per cent. solution of iodine in alcohol and a saturated, watery solution of soda bisulphate. The test is performed thus :—The urine is placed in a tube and acidulated with acetic acid ; to it is added about one-fifth of its volume of the iodine solution, which, on shaking, gives any urine a brown appearance ; finally the soda bisulphate solution is added till the brown appearance completely clears away, leaving, if albumin be present, a cloudiness or white precipitate according to the quantity.

*Aufrecht's Precipitation Tube*³ has been introduced for a more speedy determination of albumin than can be effected by the Esbach tube in common use. The tube is similar to that of Esbach, but is narrowed at its lower end to permit of fine graduation. The reagent employed is 1·5 per cent. of picric acid and 3 per cent. of citric acid in watery solution. After the urine and reagent are mixed in the tube, this is centrifuged for two minutes, and the amount of albumin precipitated is then at once read off.

UROREACTION IN TUBERCULOSIS.

A persistent acidity of the urine is said by Malmejac,[†] as the result of ten years' observation, to be a constant accompaniment of pulmonary tuberculosis. While the condition becomes more marked as the disease advances, he believes that it is so regularly present in the earliest stages as to form even a useful diagnostic feature. The urine being passed into an aseptic vessel and protected from dust, that of a healthy individual is found to become alkaline in about 7 days, while in tuberculous cases its acidity does not change for 17, and in late stages for 40 days or more. The tendency that some urines have to maintain their acidity is well known, but whether this is caused by some metabolic peculiarity of the tubercular process or is accidental requires further study for confirmation.

BACILLI PASSED IN URINE.

The presence of bacteria in the urine is now generally admitted to be a common accompaniment of some febrile diseases, *e.g.* typhoid fever. From recent researches, both on animals and on man, it has been found that the urine is very often charged with bacilli derived from some morbid focus in a distant part of the body without any evident implication of the kidneys or other part of the urinary tract. This is of great importance, both because of the power of such urine to spread disease, *e.g.* in typhoid fever, and also because of the danger

to the urinary tract. Rolly⁵ conducted experiments upon rabbits and dogs by making intravenous injections of emulsions containing bacillus pyocyaneus and staphylococcus citreus. Both in cases of apparently normal and of degenerated kidneys these bacteria were found in the urine shortly after their injection into the veins of the neck. Even more striking were the researches of Beardsley,⁶ who examined the urine of 250 tuberculous patients for the presence of tubercle bacilli, and found them in 82 of the cases. While these patients had no obvious tuberculosis of the kidneys, 60 of them were bedridden, and in 44 albuminuria, in 48 casts, were also found in the urine. The bacteria, it should be noted, were still virulent. These results form an important contribution to the debated question as to whether the spread of tubercle in the urinary tract is more frequently an ascending or a descending process. With hæmatogenous filtration of the bacilli so common an occurrence, their deposit and tubercle formation in the kidneys, ureters, and bladder can be readily understood.

PRIMARY INFECTIVE PYELITIS.

The importance and frequency of this condition as a febrile disorder which may in some cases be serious, and may in others pass off without leaving any permanent ill-effect, has come recently to be fully recognised through the experiments and observations of Lenharz, Mirabeau, Israel, Thomson, and many others. Especially in children, pyelitis, unaccompanied by nephritis, is a fairly common condition. Goppert,⁷ on the strength of 130 cases of his own observation, gives the symptoms and treatment of pyelocystitis as it affects children. It occurs most frequently, he finds, in female children, is caused usually by the bacillus coli, and appears to ascend along the urinary tract, and to be associated often with intestinal catarrh. The onset is sudden, with high temperature, vomiting, and excitement, pallor of the face, and tenderness over the kidney region, usually on both sides. Children often have marked bladder symptoms as well, and the urine is generally acid, with little albumin. The treatment consists in the administration of large quantities of alkaline waters, together with mild urinary disinfectants, and the prognosis is quite favourable. Mirabeau⁸ describes the same disease as it affects adults, and he places most reliance for differential diagnosis from similar conditions, like appendicitis, pelvic peritonitis, and peri-oophoritis, upon the following symptoms:—The characteristic temperature curve, the pain and tenderness to right and left of the lumbar vertebrae over the quadratus muscle, and the striking difference between the high temperature and slow pulse. This writer is of opinion that in adults also the common cause is the bacillus coli, and that it enters the kidney from the blood.

BILHARZIASIS.

This parasitic disease of the urinary passage has become important as a cause of mild but recurrent hæmaturia, since so many persons return to this country after contracting the worm in Egypt or South Africa. Generally the effects are slight and negligible, but sometimes small masses of the ova may become nuclei for the formation of calculi, or the mucous membrane of the bladder may become encrusted with lime salts, or there may be severe inflammation with the production of fistulæ. Such an incrustation in which the mucous membrane is studded all over with minute calculi is described and figured by Ebstein⁹ in two bladders of Egyptian natives, while Letulle¹⁰ describes an autopsy upon a Congo negro in whom the bladder, prostate, seminal vesicles, vasa deferentia, and rectum showed such masses of calcified bilharzia ova with much surrounding inflammation.

GLYCOSURIA.

Whatever may be the pathogenesis of true diabetes, it is generally recognised that persistent glycosuria may be associated with various conditions other than disease of the liver or the pancreas, though undoubtedly an affection of one or other of these organs forms the most common gross accompanying lesion. Thus, Richartz¹¹ records the case of a man aged 60 whose brother and father had died of diabetes, and in whom repeated attacks of glycosuria followed upon attacks of diarrhoea, but disappeared when the latter were cured by diet and waters. This is noteworthy in view of Bayliss and Starling's researches upon the connection between glycosuria and the secretion of the duodenal mucous membrane. Solowjew¹² records a case of large ovarian cyst in a woman of 32, in whose urine sugar was present to the extent of 3 per cent. After the removal of the tumour by operation the sugar completely disappeared. Of course in this case the interference with the other abdominal organs by pressure might be the responsible factor. The same may be said of a case recorded by Henkel,¹³ where a woman with a sixteen pound uterine fibroma and 3 per cent. of glucose in the urine lost the latter on removal of the tumour. In still another case reported by Henkel a young woman with ovarian cyst lost within 6 days after an operation all trace of the sugar which previously she had constantly excreted.

In the treatment of diabetes the allowance of a certain amount of carbohydrate is found to be more satisfactory than its complete withdrawal. Dextrin, lactose, potato and rice have each had advocates of their special suitability, but the favourite at the present time is the starch found in oatmeal. Von Noorden recommends as particularly beneficial a diet consisting of a kind of soup made from:—

250 grammes of oatmeal,
100 grammes of vegetable albumin,
300 grammes of butter,

together with an allowance of wine, brandy, or black coffee. The soup is further strengthened sometimes by the addition of eggs. Warrington¹⁴ records a number of cases in which the administration of the oatmeal diet had been followed by diminution of the sugar excreted and by greater tolerance for other carbohydrates.

ESTIMATION OF ACID INTOXICATION.

Owing to the great importance that now attaches to acetone, and still more to its precursor in the blood— β -oxybutyric acid—as the cause of the fatal issue in many cases of diabetes, various methods of estimating these substances have been devised. Unfortunately most of these are much too complicated for clinical use. Geelmayden¹⁵ gives simpler procedures for estimating these substances which he has compared carefully with the more elaborate systems, and found to be quite reliable. The details are too long to be given here, but the method for acetone may be outlined. He takes 25 c.cm. of urine, 200 c.cm. of water, and 5 c.cm. of 10 per cent. phosphoric acid; distils over one half of this fluid (containing all the acetone); then adds excess of an iodine solution and some strong hydrochloric acid and titrates the amount of iodine uncombined with the acetone by means of a thiosulphate solution and starch indicator.

A much simpler procedure which yet suffices for therapeutic purposes is recommended by Blum.¹⁶ When the organism is in a state of acid intoxication, the acidity of the urine also rises, and the amount of sodium bicarbonate that must be administered to the patient in order to render its reaction distinctly alkaline is a rough measure both of the amount required for therapeutic purposes and of the degree of acidosis present. In the healthy individual 5 to 10 grammes of bicarbonate will change the reaction of the urine, while if a moderate acidosis be present, 20 or 30 grammes may be required to effect this, and in severe cases 50 grammes or more.

SODIUM CHLORIDE AND NEPHRITIC OEDEMA.

Since the original researches of Widal much observation and experiment have been directed towards this subject, with the result that while in some cases the advantage of diminishing the intake of chloride in dropsy has been confirmed, in others its alteration has seemed to have no effect upon the course of the transudation. Thus Blooker¹⁷ found that in only one out of five cases (a case of supposed waxy kidney) did the administration of a salt-free diet have a pronouncedly favourable effect upon the dropsy. Manshardt,¹⁸ as the result of carefully dieting and examining the urine of children suffering from nephritis, came to the conclusion that in cases where general circulatory changes, anatomical alterations in the absorptive membranes,

and defects of nutrition can be excluded, an important part is played by chloride retention in causing the œdema.

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SURGERY.

THE RADICAL OPERATION FOR CANCER OF THE PYLORUS.

GROVES (*Trans. Roy. Soc. of Medicine*, Surgical Section, 1910) is of opinion that the results which follow the radical operation for pyloric carcinoma and the high mortality in such cases are due largely to the cases not being obtained early enough by the surgeon, owing in part "to valuable time being lost in employing various recondite methods of diagnosis."

He emphasises the following points:—That there is a good prospect of a cure in early cases. That exploratory operations should be performed for diagnostic purposes in all doubtful cases. That the immediate operative mortality may be greatly reduced by operating in two stages. That a more systematic attempt should be made to remove the whole of the associated lymphatic area.

The cardinal symptoms of gastric carcinoma are pain, vomiting and rapid emaciation. Of these, Groves regards rapid emaciation as the most significant. "A man with cancer of the stomach will generally lose as much weight in three months as a patient with gastric ulcer does in a year."

Groves advocates that in order to obtain an adequate removal of the associated lymphatic area as well as the primary growth, it is necessary to take away the great omentum and the tissues in front of the pancreas. This is done as follows:—A posterior gastro-enterostomy is performed. Ten days later the abdomen is reopened, the gastro-hepatic omentum is divided. Through this opening into the lesser sac the coronary artery is ligatured and cut close to its origin from the celiac axis. The peritoneum is incised along the upper border of the coronary vessels to the lesser curvature of the stomach. The pyloric

and gastro-duodenal arteries are ligatured close to the hepatic artery. The great omentum is then divided from the proposed line of section of the stomach to its left free margin. The great omentum is then turned up and separated from the anterior aspect of the transverse colon. The stomach and duodenum are then divided. The pre-pancreatic peritoneum is then removed by carrying the divided duodenum to the left and stripping off, by gentle gauze pressure, the peritoneum which passes from the pylorus on to the pancreas. This removes at the same time the peritoneum which passes from the base of the great omentum over the transverse mesocolon on to the pancreas. By this operation the entire lymphatic area connected with the pyloric end of the stomach is removed in one piece.

HENRY WADE.

TREATMENT OF GANGRENE OF THE FOOT BY ARTERIO-VENOUS ANASTOMOSIS.

Müller reviews all the cases, hitherto published, of anastomosis between the femoral artery and femoral vein for gangrene of the foot (*Annals of Surgery*, March 1910). Several methods have been tried. In the first three cases lateral anastomosis between the artery and vein in Scarpa's triangle was performed, but all were unsuccessful. In nine cases end-to-end anastomosis was done, the proximal end of the artery being sutured to the distal end of the vein, and the distal end of the artery and the proximal end of the vein were occluded by ligatures. In one case, operated on by Hubbard, the latter pair were also anastomosed to each other in order to produce a reversal of the circulation. Of the ten patients, eight suffered from senile gangrene, one from angio-sclerotic gangrene, and one from "obliterating thrombo-angitis." After the operation, one died from shock in thirty-one hours, and three others died at periods from eight to sixteen weeks. Two cases were operated on early, and in one a perfect result two months after the operation was claimed, while the other was progressing favourably, but amputation had to be carried out for pain. The remaining four required amputation, either at the seat of election or above the knee, at varying periods after the anastomosis.

The object of these operations is to transform the deep veins into arteries, and to establish a venous return, primarily through a set of inter-anastomosing deep venules, but in the main through the long saphenous vein. The valves in the popliteal vein are soon forced by the blood-stream, thus allowing the blood to flow in the reverse direction in the veins. If the veins are also thrombosed, the operation is useless.

Müller concludes that in the early stages of arterial disease, producing pain, tingling, mottling, and ulceration of the toes, a complete reversal of the circulation may relieve the condition. If gangrene of a toe is already established, one should wait for a line of demarcation.

If the process involves several toes, or tends to spread to the dorsum of the foot, an end-to-end anastomosis between the femoral artery and vein, perhaps with ligation of the external saphenous vein, as advocated by Buerger, will almost certainly induce a line of demarcation in the region of the ankle.

JAMES LOCHHEAD.

CONGENITAL SACS IN OBLIQUE INGUINAL HERNIA.

In a paper illustrated by fourteen diagrams drawn from his operation cases, Hessert states that a pre-existing congenital sac was the chief factor underlying the development of oblique inguinal hernia in fully three-fourths of his last hundred cases (*Surgery, Gynecology, and Obstetrics*, March 1910). In diagnosing the sac as congenital, he finds the following points of value:—(1) Glove-finger-like and narrow sac, generally empty; (2) thin wall; (3) absence of subserous fat; (4) trabeculated structure; (5) annular constrictions, which often still correspond with the internal or external ring, but are frequently displaced beyond the ring; (6) thickening of fundus; (7) fibrous process extending downward from fundus for a variable distance, sometimes attached to the tunica vaginalis; (8) close relationship of sac to vas deferens and spermatic vessels, the latter being frequently spread over the sac; (9) sac still enveloped by fibres of the cremaster muscle.

JAMES LOCHHEAD.

THE RESULTS OF BISMUTH PASTE INJECTIONS.

Giron, in the *Gaz. des Hôpît.*, 4th June 1910, records the results of five cases of chronic suppuration treated by the injection of bismuth paste. The results were not altogether satisfactory. A sinus in the ischio-rectal fossa healed after three injections; a sinus in connection with a large empyema, which had been twice operated on, healed after six injections. Two abscess cavities, the result of acute osteomyelitis in the upper end of the tibia, healed rapidly after scraping and injection with the paste. No improvement was observed in a case of chronic suppuration of the femur subsequent to a fracture. The fifth case treated ended fatally. The patient was suffering from tuberculous sinuses of the hip, with copious discharge and a swinging temperature. Ten days after injection pain and local inflammation developed, the temperature rose, and the whole lower limb became œdematous. The patient died a few hours later quite suddenly. There was no bismuth poisoning, the symptoms pointing rather to a septic phlebitis and pulmonary embolus.

Similar deaths have been recorded after the injection of paraffin for deformities of the nose. Giron is of the opinion that bismuth injections are contra-indicated in the presence of temperature, and that

the first preparation of Beck, which contains no paraffin, should only be used.

In a paper on the same subject, Codet-Boisse (*Gaz. Hebdom. des Scien. Med.*, 8th May 1910) also gives the preference to Beck's first preparation of bismuth vaseline, which he finds satisfactory for diagnosis, whilst the paraffin preparation is liable to cause local sepsis from retention of discharges, or bismuth poisoning if the injections are repeated. To avoid the latter risk Codet-Boisse has tried the injection of Mosetig's iodoform preparation, and has found it quite as useful for X-ray diagnosis as the bismuth paste. The after-results have also been encouraging, and the risks of intoxication are much less than with bismuth.

JAMES M. GRAHAM.

THE TREATMENT OF WOUNDS OF THE HAND BY TINCTURE OF IODINE.

In injuries of the hand of workmen it is difficult to cleanse the skin, even with vigorous rubbing and strong antiseptics. There is risk also in carrying infection into the deeper parts by the solutions used for their cleansing. With any sort of dressing, dry or moist, aseptic or antiseptic, inflammation is liable to follow. The technique employed by Paul Reclus (*Bull. de l'Acad. de Med.*, 3rd May 1910) for wounds of the hand is simplicity itself.

The parts surrounding the wound are painted over with tincture of iodine, which is also applied to the wound itself. The alcohol evaporates and leaves the skin stained brown with the iodine; when dry a sterile dressing is applied, covered with absorbent wool and fixed by a bandage. The tincture of iodine is applied again on the following day, and subsequently at intervals of three or four days. Preliminary washing or douching of the part is strongly deprecated, as it disseminates infection, and the saturation of the skin with fluids prevents the penetration of the iodine. The tincture used should always be fresh; after eight days it is not so effective, and may irritate the tissues. The application to raw surfaces causes very little discomfort. The patient may feel a sensation of warmth or smarting, but there is no pain. Walthu has shown that seven minutes after the painting with iodine the deepest parts of the skin are sterile. The results of this treatment has been a marked improvement on other antiseptic methods. Phlegmons of the hand practically never occur in wounds treated with the tincture of iodine. Both for its simplicity and efficiency it should prove an ideal emergency dressing. It was much used in the Russo-Japanese War, and accounts, to a great extent, for the remarkable success in the treatment of field injuries in that war.

JAMES M. GRAHAM.

INFECTIOUS DISEASES.

By CLAUDE B. KER, M.D., F.R.C.P.

EPIDEMIOLOGY OF WHOOPING-COUGH.

GUERASSIMOVITCH (*Prakt. Vrach.*, 4 juillet 1910) has written an article on this subject, which is well reviewed in the *Semaine Médicale* (7th September 1910). He has been struck with the fact that of 25 children exposed to 2 cases of whooping-cough for 16 days not one took the disease. This is quite in accordance with the observations of Perret and Givre, who, dealing with a ward in which whooping-cough cases were admitted with the other patients, found that of 302 children only 2 contracted the infection. Again, Weill noted that 93 children, all susceptible, who were in frequent contact with 15 patients in the paroxysmal stage of whooping-cough, all escaped infection. This goes far to prove what some of us have been teaching for some years—that after the paroxysmal stage is fairly started the infectivity of this disease is extremely low. Corroborative evidence of a bacteriological nature is not wanting. The bacillus of Bordet and Gengou is very difficult to find after the first week of the paroxysms, and it would appear unnecessary to isolate whooping-cough patients when this period of the disease has been reached.

Guérassimovitch considers that adults play a considerable part in the dissemination of the disease. He admits that direct contact is the usual method of transmission, but points out that children not infrequently contract the infection although they have not been exposed to any infected child. The explanation is that the illness can run an abortive or latent course, and, particularly in adults, the whoops may be altogether wanting. The older the patient the less likely is the disease to be characteristically developed, and most frequently a definite diagnosis can only be made after the attack when younger members of the family suffer from more typical paroxysms. Guérassimovitch gives some most interesting examples of parents and others suffering from this modified form of whooping-cough, the symptoms mentioned being coryza, dry, painful cough of a paroxysmal nature, but not characterised by the usual stridorous inspiration, and a tendency to vomit. It is certainly quite possible that many cases of the disease in adults are missed, and we can agree with the author that, as in mild unrecognised scarlatina or ambulatory typhoid, a considerable amount of mischief can be done by the patient.

DIPHTHERIA AND MENINGEAL SYMPTOMS.

In very severe and poisoned cases of diphtheria the condition known as meningism has been not infrequently observed. Bitot and Petges (*Gaz. Hebdom. des Sciences Méd.*, 1 mai 1910) report an interesting case,

in which the meningeal symptoms were so marked that the condition was at first regarded as cerebro-spinal meningitis. The patient presented the further peculiarity of having no obvious throat or nose lesions, and the cause of the cerebral irritation would have been undetected had not a culture been made of the naso-pharyngeal mucus, which was found to contain the Klebs-Löffler bacillus in some quantity. The illness passed through two stages. In the first, which lasted 10 days before admission to hospital, intense persistent headache, pain at the back of the neck, vomiting, constipation, prostration, and some degree of fever were the prominent features. In the second stage further symptoms—photophobia, stiff-neck, trismus, and a suggestion of Kernig's sign—were observed. Lumbar puncture was practised, and 10 c.c. of clear fluid, under pressure, were drawn off, but no evidence of a true meningitis was obtained on microscopical examination. The patient rapidly improved after two injections of anti-diphtheritic serum, and a further proof of the nature of the malady was that a man in an adjoining bed contracted diphtheria. It would appear, then, that the diphtheria bacillus may occasionally, without the formation of false membranes, be capable of causing symptoms which suggest acute meningitis, and the authors consider that bacteriological examinations of the throat and nose may be of the greatest value in clearing up a doubtful case. Bitot also refers to a case previously under his care, a child of 4 years of age, in whose secretions the bacillus was present, and who suffered from clonic convulsions, trismus and muscular rigidity, all of which disappeared after antitoxin was employed.

INFECTIVITY OF TYPHOID SPUTUM.

Tenney (*Boston Med. and Surg. Journ.*, 28th July 1910) has summarised the literature on this subject, and points out that systematic investigations do not appear to have been made. In the text-books it seems to be generally assumed that the sputum may be infectious, and Richardson and others have reported cases in which bacilli have been present. It may be remarked, however, that these cases appear to be exclusively those in which pneumonic or bronchitic complications exist. Tenney made examinations of the sputum and saliva of 53 cases of typhoid fever, several of which showed bronchial symptoms, but none either pneumonic or laryngeal complications, and in no instance did he detect the presence of typhoid bacilli. Other experiments proved that the bacillus will live for at least 125 days in sputum or saliva, and can be readily transplanted from one specimen of such material to another and kept growing at room temperature for a long time. While these results tend to show that in pneumonic cases it is quite possible that the sputum may remain for long infectious, they certainly prove that

bacilli are most unlikely to be present in the saliva or sputum of patients who have not suffered from pulmonary or laryngeal complications, and that in consequence these discharges cannot play any important part in the dissemination of the disease.

SMALLPOX AND VACCINIA.

The practical identity of smallpox and vaccinia has always been difficult of proof, and many workers have found it impossible to produce vaccine vesicles in the calf by the inoculation of smallpox lymph. The most successful experiments in this country, those of Copeman, depended upon the smallpox matter being first passed by inoculation through monkeys, and thereafter through a series of calves, typical vaccine vesicles being produced from which children were successfully vaccinated. Kelsch, Teissier and Camus (*Bull. de l'Acad. de Mèd.*, 19 juillet 1910) describe the difficulties which have confronted them in their attempts to produce satisfactory results, and they remark that, whereas in other countries the apparent transformation of smallpox into vaccinia is regarded as proved, in France all experiments in this direction have been quite fruitless. In a first series of observations, reported a year ago, they found that whereas 9 calves inoculated with smallpox at the Infectious Diseases Hospital all failed to give anything more than simple inflammatory reactions, other calves, stalled in the stables used for vaccination purposes, and merely scarified with glycerine, developed typical vaccine vesicles. This, of course, raised the question as to how far success in other countries has depended upon accidental contamination with vaccine lymph in stables usually employed for calves used to provide vaccine. We may remark, in passing, that it would be extremely interesting to know if this fallacy could vitiate the experiments of Copeman.

The French observers determined on a further series of experiments, and took advantage of the presence of a small outbreak of smallpox to obtain virulent lymph. The calves, of which about 60 were employed, were brought up to the windows of the ward in which the patients were being nursed, and were directly inoculated into about 25 to 50 scarifications. Rabbits were also inoculated, and in all cases the results were as completely negative as they had been in the preceding year. On the other hand, the inoculated animals appeared to be less susceptible, than is ordinary, to the vaccinations subsequently practised. The rabbits, in particular, failed to give good vesicles. As had happened in the previous year, 3 out of 4 calves, stalled in buildings employed for the preparation of vaccine, developed undoubted vaccinia, although in their case the inoculation had been performed *à blanc*, that is to say, merely with glycerine for control purposes. Kelsch and his colleagues consider that this curious fact emphasises

the extraordinary susceptibility to vaccine infection possessed by calves, and that it is sufficient to nullify all the successes reported by other workers in cases where the experiments have been carried out "in vaccine institutes." Isolation of animals used for experimentation purposes is therefore absolutely necessary.

Kelsch admits that it is logical to consider vaccinia as a derivative of variola. The relationship between the two conditions is too striking to be denied. But the nature of the relationship, from his point of view, remains in doubt. He is obviously not prepared to accept the bodies described by Guarnieri as the actual cause of both smallpox and vaccinia, although the recent work of Councilman and others has done not a little to confirm such a view.

It is perhaps only natural that papers with such an important bearing on this subject should have attracted the attention of those who are concerned in the preparation of calf lymph, and we find Kelsch and his collaborators (*Gaz. des Hôpit.*, 27 janvier 1910) replying to strictures which appear to have been made by the directors of the vaccine institutes of Hamburg and Strasbourg. They are careful to say that the transformation of smallpox into vaccinia is not impossible, but must be done under special conditions if a successful result is to be accepted. They regard the relationship of variola to vaccinia as a fact which is unique in pathology, and is extremely difficult to explain.

While we can hardly fail to be deeply impressed with the interesting results obtained by these workers, it is a pity that no serious attempt was made to confirm or refute the experiments of Copeman. That author attributes his success entirely to his use of lymph from cases of inoculated smallpox as against true smallpox. As inoculation is illegal in this country, he was forced to use monkeys as the intermediary stage between the human being suffering from true smallpox and the calf. Moreover, the lymph from the lesions in the first calves inoculated had to be reinoculated through several others before vaccine vesicles were obtained. In Kelsch's paper it is made clear that one calf was inoculated from a monkey suffering from inoculated smallpox. Presumably the experiment failed, but, even then, we are not told if any attempt was made to carry on the virus through a series of calves, and there is no suggestion that in other instances monkeys were made use of. To refute the experiments of Copeman, a much more extended trial of his method would be absolutely necessary. It would, however, as has been said above, be of great interest to know if the English experiments were carried out in a vaccine institute, and if contamination from such a source was at all possible.

DISEASES OF THE EAR, NOSE, AND LARYNX.

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NOTES ON THE TREATMENT OF LARYNGEAL TUBERCULOSIS.

FOR the successful treatment of laryngeal tubercle it is just as essential to make an early diagnosis as it is in pulmonary disease of the same nature. In every case of pulmonary tuberculosis a routine examination of the larynx should be made at regular intervals. Symptoms of laryngeal involvement may be absent, and laryngoscopic examination is imperative so that the earliest manifestations may be detected and the appropriate treatment at once commenced.

It is always interesting and very instructive in surgical work to observe the swing of the pendulum and its gradual adjustment with increasing experience to what may be regarded as the correct mental attitude to adopt towards any surgical procedure. Prior to the last decade, the operative treatment of laryngeal tubercle was a procedure which found much favour, and in an abstract of recent literature in this *Journal* upon this subject, the papers then quoted dealt largely with the various methods of operative interference. To-day the pendulum has swung in the opposite direction, and treatment is essentially that of rest to the organ, combined with the administration or direct application of such drugs as may be considered appropriate for individual cases. It is true that in cases of tubercular disease of the epiglottis removal of the diseased structure may prove the most satisfactory procedure, and submucous puncture of localised infiltrations with the electric cautery may be followed by excellent results. Nevertheless the general attitude towards the treatment of tuberculosis of the larynx is to refrain from active interference. The excellent results that were obtained by tracheotomy furnished proof of the value of enforced rest to the larynx. If a patient can be brought to look upon his illness seriously from the first, and is ready to submit to such an irksome regulation as complete silence, in many cases the end justifies the means employed. The conditions of ordinary life for the most part make it impossible for the individual to preserve silence for many months, but there are instances in which this has not been found impossible. On the other hand, it may only be in the sanatorium that this line of treatment can be strictly enforced. The class of case in which complete vocal rest is specially indicated is that in which an obstinate catarrh of the larynx complicates the pulmonary condition, where there is congestion of the vocal cords, or circumscribed ulceration,

and in ulceration of the interarytenoid fold. Even in cases where there is a good deal of infiltration this has disappeared under the rest treatment. Cicatrisation and arrest of the disease in the larynx may take place, although the pulmonary condition is not progressing satisfactorily. Certain cases develop of themselves a natural resistance, which may be sufficient to arrest the disease. Such cases may show other signs which indicate a power of resistance, and which may lead one to regard them in a more hopeful light; the local condition is not diffuse, the lesions are not progressive, the pulmonary affection is limited, the bacilli are few in number, while the pulse-rate is not accelerated to any extent, and the patient shows but little emaciation.

While in some cases voice rest, combined with general treatment, has proved sufficient in itself to arrest the laryngeal condition, local treatment is always helpful and in many cases indispensable.

To discuss the value of sunlight as a therapeutic agent in laryngeal tubercle seems hardly appropriate in a Scottish journal, nevertheless it is interesting to note the opinion of those who live under more genial climatic conditions. Several writers have dealt with the subject, and have expressed themselves favourably in connection with it. In the German Sanatoria in Davos this method of treatment has been adopted, and in a number of cases, even of an advanced type, excellent results have been obtained. Janssen (*Deutsch. med. Wochenschr.*, 13th May 1909), writing on the subject, states that good results followed its use. The principle of the treatment consists in allowing the sun's rays to fall directly upon the diseased parts. The patient is placed with his back to the sun, and the rays are allowed to fall upon a mirror from which they are reflected on to the laryngeal mirror which he holds in his throat. As he sees the reflection of his own larynx in the mirror placed in front of him, he is able to keep the rays directed upon the diseased part. In individual larynges there may of course be mechanical difficulties, but with practice considerable skill is obtained. As a rule two sittings daily are allowed, the duration of each being from a half to one hour in length.

While practical experience seems to be yet somewhat limited with the treatment by tuberculin, it appears to present a sufficiently encouraging outlook.

Jereslaw (*Deutsch. med. Wochenschr.*, 15th April 1909) has experimented with Marmorek's antituberculous serum in the treatment of laryngeal phthisis. While watching its effects in pulmonary tuberculosis he was forced to the conclusion that its action on the pulmonary disease was far from satisfactory, but in those cases in which a laryngeal complication was present the disease in that situation was very favourably influenced. For this reason he has limited the exhibition of Marmorek's preparation almost exclusively to tubercular laryngeal affections. Two

methods of application were employed, namely, per rectum and by subcutaneous injection. A disadvantage of the rectal method lay in the difficulty of carefully estimating the exact amount which the patient absorbed. At the same time it had the advantage of being usually well tolerated, and the troublesome symptoms, which often appeared in a striking way when the serum was administered subcutaneously, were almost avoided. He preferred, however, the subcutaneous injection as long as the patient was able to tolerate it.

The complications met with most often were redness and swelling at the site of injection, localised or general erythema, urticaria, pains in the joints and limbs and acceleration of the pulse, rise of temperature and headache. It was found more satisfactory to make the injection every second day, and after each series of injections to give an interval of two or three weeks. Each course consisted of ten injections of five cubic centimetres in amount. Two, three, or four courses of injections were administered.

The cases were not specially chosen for the purpose, and the laryngeal appearances varied considerably, infiltration and ulceration being more or less conspicuous features in the twelve cases thus treated. One or two examples may be cited here. A man, æt. 53, showed the left true cord considerably infiltrated and partially destroyed, while upon the left false cord there was a well-marked tubercular ulcer. He submitted to two courses of subcutaneous injection. When discharged at the end of the treatment the condition had much improved. The infiltration of the left true cord had almost completely disappeared. The ulcer on the left false cord showed a tendency to cicatrisation. Further treatment, as an outpatient, of a similar nature was recommended. A year later inquiry elicited the fact that the patient felt well and had been able to do his work almost continuously. In another case, a male æt. 23, the right vocal cord was reddened and infiltrated. Three courses of the serum were given subcutaneously. At the end of the treatment the local condition was looked upon as cured, the infiltration having disappeared. In all the cases tubercle bacilli had been found before the treatment was commenced. In three of them they had disappeared when the treatment was completed. The general conclusions arrived at in the twelve cases treated in this way were as follows:—In three, slight improvement; in five, moderate improvement; in three, distinct improvement; in one, a cure. The earlier the laryngeal disease comes under observation, the more limited it is, and the sooner the treatment with the serum is commenced, the more favourable are the chances of a good result being obtained. The injections must be continued for a sufficiently long period, four courses being administered if improvement has not manifested itself earlier. The author considers that Marmorek's serum is of undoubted value in the treatment of laryngeal tuberculosis.

There is no doubt that the application of the galvano-cautery to the larynx is in considerable favour at the present time in the treatment of this affection, and cases are from time to time demonstrated at the various laryngological societies, and its beneficial results are pointed out. The cases most suitable for such treatment are those in which the general condition of the patient is favourable and in which the local disease is not of a rapidly advancing nature. Infiltration of the epiglottis, aryepiglottic folds and ventricular bands are suitable for this method, but care should be taken to avoid injury to the crico-arytenoid joint. The object of the treatment is not to burn away the disease, but to bring about a fibrous process, and thus assist Nature in the cure of the condition. Under local anæsthesia the operation may be carried out either under the guidance of the mirror or by the direct method through the straight laryngeal tube. The application of the cautery point is of the nature of a puncture, the infiltration being merely stabbed by the instrument. A second application is made in two or three weeks or even after a longer interval. While in some cases reactionary swelling follows the procedure, in many no trouble ensues, and the patient may experience an almost immediate relief from the dysphagia. In painful infiltration of the epiglottis, the galvano-puncture has been successfully used in place of removal of the epiglottis. When combined with complete voice rest this form of local treatment has proved very satisfactory.

Among the more recent methods of treating the pain of laryngeal phthisis which appear to be of some value is that which Hoffmann has introduced by injecting alcohol into the trunk of the superior laryngeal nerve (*Monch. med. Wochenschr.*, 1908, No. 14, p. 739). He was led to try this form of treatment, stimulated by Schlösser's experience of it in cases of trigeminal neuralgia. Schlösser found that the motor fibres of the nerve were not affected by the injection. Hoffmann confirms this observation, and, moreover, has not experienced any evil effects as a result of the injections. The technique of the injection is as follows:—The skin is cleansed with alcohol and ether. The patient lies on a couch, and a bolster is placed under the neck, so that the larynx is made to stand well forward. An 85 per cent. alcohol solution is used, heated to 45 (113 F.). The tender point is sought for in the thyrohyoid membrane, which corresponds with the point of entry of the superior laryngeal nerve into the larynx, and the index finger of the left hand is placed immediately below this point, while the thumb pushes the larynx over towards the affected side. The needle should be introduced at right angles to the skin and rather nearer to the hyoid than the thyroid cartilage. It is convenient to have a length of 1½ cm. marked off on the syringe, as that is about the depth to which the needle should be carried. If the nerve is touched, the patient at once complains of severe pain in the ear; a few drops

of alcohol are then injected, the pain increases for a little and then passes off gradually; more alcohol is thereupon injected, and if there is no pain the needle is directed a little to the side, and again a few drops are injected; if the pain still remains in abeyance, the needle is withdrawn. In all $\frac{1}{2}$ - $1\frac{1}{2}$ c.cm. of alcohol are injected. If the effect is not lasting the injection may be repeated.

In a later paper (*Zeitschr. f. Ohrenhk.*, Bd. lix. 1909, p. 168) Hoffmann reports on his experience of 36 cases which he has treated by this method. In all the pain was abolished; the analgesia lasted a varying period after the injection—in one case as long as 40 days. Hoffmann still continues to use the same technique.

Dundas Grant (*Lancet*, 25th June 1910) has also given this method a trial. He adopts the technique described by Hoffmann, and uses the solution recommended by Dr. Purves Stewart, consisting of two grains of hydrochloride of eucaine β in an ounce of 80 per cent. alcohol. He gives notes of 6 cases treated in this way; in all of these pain was a marked feature, and was greatly relieved by the injections.

It is not a matter of surprise that Bier's congestion method should have been tried in the treatment of dysphagia in laryngeal tuberculosis. Grabower (*Zeitschr. f. Ohrenhk.*, 1910, Bd. lx.), in a paper on this subject, quotes Polyak, who reports that he has treated 200 cases by venous congestion. In 80 per cent. of these the pain was diminished. Katz, on the other hand, has not had good results. Grabower himself has only observed favourable results from this method of treatment, though the total number of his cases is small. He uses a rubber band $2\frac{1}{2}$ cm. in breadth with two bands attached to it which pass under the axillæ; these prevent the rubber band from slipping. The band is adjusted under the larynx, and is fastened as tight as the patient will bear it, so that the face becomes slightly blue; it is left on for 6 hours on the first day, 12-15 hours on the second day, 18 hours on the third day, and from the fourth day onwards it is left on for from 20-22 hours.

After the second day the pain gets less; on the fourth day the patient can swallow fluids and slops, and after the sixth day he can swallow solids without pain. On examination of the larynx during the first few days, while the bandage is on, a marked increase will be noticed in any œdema that was previously present. The œdema, however, gradually diminishes, and after from 10 to 12 days is usually less than it was originally. Notes are given of 8 cases which were observed, some of them for over 20 weeks; in all of them the pain was relieved, the freedom from pain being maintained even till the death of some of the patients.

NEW BOOKS AND NEW EDITIONS.

A Plea for the Home Treatment and Prevention of Scarlet Fever. By ROBERT MILNE, M.D., Ch.M. Pp. 80. London: James Nisbet & Co. 1910. Price 2s.

IN this little book Dr. Milne gives some account of the treatment of scarlet fever which he has found useful in Dr. Barnardo's Homes and also in private practice. It consists, as is now well known, in the inunction of the patient with pure eucalyptus oil and the swabbing of the tonsils with 1 in 10 carbolic oil. Not only does he claim by this method to prevent any infection arising from patients so treated, but he states that complications are almost unknown. Isolation is not regarded as necessary, and the scarlatinal patient is allowed to mix freely from the first with susceptible individuals. The author describes his management of several outbreaks, and his success has certainly been very remarkable. He makes out a good case for a systematic trial of his method, especially for schools and institutions where patients can be treated from the first symptom. We think this last point important, as Dr. Milne appears to regard the failure of some who have attempted to carry out his system as due to the fact that the treatment was begun too late.

How far, indeed, the system will prove generally useful is a subject for legitimate doubt. Dr. Milne does not appear to realise that scarlet fever is often a disease of a very low infectivity. It is not unusual for desquamating patients to attend schools for days or weeks without doing any harm, and it is not an uncommon experience in fever hospitals to see a scarlet fever case, which has been overlooked and admitted to a diphtheria ward, remain many days among susceptible children without causing infection. Desquamation *per se* is nowadays regarded as very unimportant, and we are glad to notice that Dr. Milne lays proper stress on infection from the throat. We must admit that his freedom from secondary cases in the early days of the fever suggests that a prolonged trial of the carbolic oil treatment is well worth undertaking. His book in any case cannot fail to interest the general practitioner, and will probably be of service in assisting to teach both the profession and the public that the isolation practised at present for scarlet fever is unnecessarily long. It must, nevertheless, be added that in the two great fever hospitals in which his system has been tried it has failed to give the results claimed for it.

Sight-Testing made Easy. By W. WRIGHT HARDWICKE, M.D. London : J. & A. Churchill. 1909. Price 2s. 6d. net.

IN his preface the author states that his intention in writing this book is to enable the busy practitioner to test the sight of a patient and prescribe the necessary glasses in the shortest possible space of time. This he proposes to do in the 66 pages.

The book is far from complete, for no mention is made of retinoscopy or other important objective tests familiar to every medical student nowadays. Subjective tests alone are adopted in this lightning process, which, as every teacher of ophthalmology knows, is antiquated, and insufficient even for the up-to-date optician.

The title of the book, although catching, is entirely misleading, for there is no easy road to acquiring a practical and accurate knowledge of estimating errors of refraction except by hard application in the ophthalmic clinique under a trained ophthalmologist.

It is somewhat amusing to find the Greek derivations of the terms employed in refraction in a small book like this, especially when it is remembered that the medical student of to-day, even although he can put the mystical letters M.A. after his name, is, as a rule, unacquainted even with the Greek alphabet.

Objection must be taken to the name of a prominent advertising firm of opticians appearing on several of the woodcuts. This, we maintain, is most objectionable.

The book, so far as we can see, can serve no useful purpose, and we are bound in justice to our readers to say so in a frank and unequivocal manner.

A Text-Book of the Diseases of the Ear, for Students and Practitioners.

By Professor Dr. ADAM POLITZER. Translated and Edited by MILTON J. BALLIN, Ph.B., M.D., and CLARENCE L. HELLER, M.D. Fifth Edition. Revised and Enlarged. Royal 8vo. Pp. xiv. + 892. 337 Illustrations. London: Baillière, Tindall & Cox. 1909. Price 25s. net.

It is unnecessary for us to criticise this work which is deservedly looked upon as a classic. It is sufficient to record the appearance of a translation of the fifth edition, and to offer to Messrs. Ballin and Heller the thanks of those whose knowledge of German is not sufficient to render the work available for reference in the original. Great advances have been made, as the editors state in their preface, during the last few years in the pathology of the diseases of the internal ear, and the improved technique in operative measures on this region of the organ of hearing have opened up a new field in the practice of otology. We shall therefore restrict our remarks to the sections of the work dealing with these subjects. The methods

of eliciting vestibular nystagmus are not given in sufficient detail to enable one who has no knowledge of the subject to carry them out, and the conclusions which may be drawn from the results of these tests are omitted. The section on Labyrinthine Suppurations, however, is excellent, and gives a concise account of our knowledge of this difficult subject at the present day. The chapter on Intra-Cranial Complications reaches a high order of merit. This new edition certainly deserves success, and we recommend it very heartily.

Drugs and the Drug Habit. By HARRINGTON SAINSBURY, M.D.,
F.R.C.P. Pp. 307. London: Methuen & Co.

DR. SAINSBURY'S volume is not a text-book of pharmacology, but an historical and analytical examination of the principal groups of drugs in therapeutic use, followed by an account of the acquisition of habit and its treatment.

He examines and details the use of our principal drugs in their respective spheres, and proves that such use is not haphazard, but has a distinct and defined aim.

An examination of their use and usefulness is followed by a discussion on the acquisition of habit—particularly in regard to alcohol and opium. The chapter on the Formation and Treatment of the Alcohol Habit is particularly good, both in the statement as to what has already been done towards its eradication and in the lead he gives as to what is still wanting on the part of the State and of the medical man to secure its ultimate suppression. The volume is evidently the work of one who has had a very large clinical experience, and is well worth the perusal of those who are interested in the subject.

Theoretische Grundlagen zum Praktisch-Chemischen Unterricht der Mediciner.

By ARTUR KONSCHIEGG. Pp. vii. + 153. Wiesbaden: J. F. Bergmann. 1908. Price 3s.

IN the Austrian universities the student of medicine is required to take practical courses of chemistry in his first and in his second summer session, his lecture course, taken in the first winter, generally preceding his practical work. This arrangement has obvious disadvantages, and indeed it would be difficult to find justification for it on any pedagogic ground, as it involves complete separation of the systematic from the practical instruction. These disadvantages are apparently felt by teachers, and the little book under review has been written for the purpose of bridging the gap between the two arbitrarily sundered disciplines. It gives, along with brief practical instructions for analytical work, the necessary descriptive and theoretical material for the proper comprehension of the analytical process.

With regard to subject-matter, the book is divided into the following sections:—Qualitative analysis, quantitative analysis (gravimetric and volumetric), organic analysis (organic acids, alkaloids, proteins, carbohydrates, urine). The organic portion occupies fully half the book, and is, on the whole, the most successful.

The Diseases of Children. By JAMES FREDERIC GOODHART, M.D., LL.D., F.R.C.P. Ninth Edition. Edited by GEORGE FREDERIC STILL, M.A., M.D., F.R.C.P. Pp. 931. London: J. & A. Churchill. 1910.

FOR many years Goodhart's text-book on *The Diseases of Children* enjoyed a well-deserved popularity by reason of the reputation of its author and the original and attractive manner in which he represented his views, which gave his readers food both for thought and reflection.

In 1902, with the co-operation of Dr. Still, the work was re-issued in a considerably enlarged form, and it cannot be a matter for surprise that with two authorities of such wide experience and extensive knowledge of the subject fresh additions are being constantly demanded. The present volume is somewhat bulkier than its predecessors owing to the addition of new material and the introduction of several illustrations, which, however, are not sufficiently numerous to add greatly to the value of the work.

Amongst the new material, descriptions are given of Henoch's purpura, pyelitis, ophthalmia neonatorum, and the status lymphaticus chiefly in its relationship to adenoids, and the authors point out the special risk of administering an anæsthetic in these cases.

The subject of infant feeding has been considerably elaborated, and the indications for the use of whole milk and sour milk discussed, although the writers appear to be somewhat sceptical as to the advantages of these methods of feeding. In the chapters on Stomach Disorders attention is drawn to the serious results that sometimes follow on dental caries, and there are some interesting pages on the relationship of fever with digestive disorders. The subject of congenital hypertrophy of the pylorus has been practically re-written, and the opinion is advanced that if surgical measures have to be adopted the choice should lie between Loretta's operation and pylorotomy.

The book has been completely revised and brought up to date, and the authors have to be congratulated on the issue of a ninth edition of a deservedly popular text-book.

Manual of Tropical Medicine. By ALDO CASTELLANI, M.D., and ALBERT J. CHAMBERS, M.D. Pp. 1242. With 373 Illustrations and 14 Coloured Plates. London: Baillière, Tindall & Cox. 1910. Price 21s.

THE work is divided into three parts, the first, or introductory, including a history of tropical medicine, tropical climatology, the effects of tropical climates on man, and the incidence of disease in the tropics. The various subjects are treated with great skill, and the chapters provide interesting reading.

The second part treats of the causation of disease in the tropics, including physical, chemical, and biological causes. The chapter on Parasites is, as might be expected from Castellani's record, particularly good, though here and there the attempts to indulge in fresh forms of nomenclature are a little confusing.

The third part—diseases of the tropics—is divided into fevers, general diseases, and systemic diseases. Here the authors supplement the results of their own experience by very numerous references to the published results of other workers, with the result that the work is the most comprehensive on diseases of tropical climates hitherto published.

Unlike many books on this subject, it is thoroughly up to date: as an instance, the trypanosoma *Cruzi* (with the effects it produces in man) is fully described.

In order to save space no references are made to laboratory methods; but if, as recommended by the authors, the worker in tropical medicine provides himself, in addition to this book, with Daniel's or Christopher & Stephens's work on *Practical Methods*, he will, for all ordinary purposes, be thoroughly equipped with the literature on his subject.

We have no hesitation in saying that this is the best all-round manual on tropical diseases which has yet appeared.

A Text-Book of Medical Jurisprudence and Toxicology. By JOHN GLAISTER, M.D., &c. Edinburgh: E. & S. Livingstone. 1910.

THIS is the second edition of the author's well-known book, which appears in a new form, inasmuch as the present volume is devoted wholly to medical jurisprudence and toxicology, the subject of public health having been left out with a view to publication in a separate volume. We believe the change will be welcomed, since by this means Professor Glaister has been able to extend the scope of his work, more especially in the department of toxicology.

The book as a whole will be found thereby much improved, and to constitute not only a valuable addition to medico-legal works in the English language, but to stand as a monument of the author's industry, keen observation, and power of clear exposition.

The chapters on personal identity, medical evidence, and the medico-legal relations of the sexual functions may be mentioned as especially noteworthy, while those on lunacy in its medico-legal aspects are admirable, and form a most useful contribution to the literature on the subject. A criticism which may be made is that some subjects, such, for example, as that on personal identity, have been accorded more detailed consideration than their practical importance would seem to warrant in a text-book destined for the use of the ordinary medical or law student. On the other hand, there are subjects relating to questions which are encountered in everyday medico-legal practice which might, in our opinion, have been more fully discussed with advantage.

In this connection we may mention the various forms of death from asphyxia. For example, in the consideration of drowning, the difficulties of diagnosis are not laid stress upon, notwithstanding the fact that, whether as a result of putrefaction or of other causes, these difficulties are very real, and during recent years have inspired numerous important investigations. In this field the work of Brouardel and Loye, Carrara, Revenstorff, Leers, and many others is deserving of mention, in view of its historical, as well as its practical, value. Hanging, strangulation, and throttling are considered together, and we cannot help thinking that each of these important forms of violence was worthy of separate treatment in a book on medical jurisprudence designed either for the student or for a work of reference, and that such individual consideration would have led to a clearer exposition of the outstanding features of each. We find no reference to suicidal strangulation, although such cases are by no means so rare as was once supposed, and, as was recently shown at Chester Assizes, wholly fallacious views are held in regard to it. Again, we have failed to find any reference to the local internal injuries in cases of hanging, strangulation, and throttling, or to the sequelæ often present after assaults by throttling.

It is of interest to note that the author states that in the bulk of his cases of hanging the mark of the ligature was situated between the hyoid bone and the line of the lower jaw. Such a situation is most unusual in the experience and is contrary to the observations of most authorities, and we wonder whether "between the hyoid and thyroid cartilages" was not meant. In dealing with rape we gather, on page 453, that the author advocates the staining of spermatozoa as the best means for detecting them in stains. We trust that such an experienced medical jurist as Professor Glaister does not intend this method to be used in preference to treating the stain simply with water, and searching for the organism in this fluid, in which, if present, it can as a rule be easily detected. Personally, we should feel inclined to distrust the evidence of a witness who only used a

staining method, and did not employ the simplest and most irreproachable means of examination. The examination of blood stains is very fully considered, although a little more dogmatism as to the comparative importance in practical work of the various blood spectra would have been advisable, and in this connection we think there is an error, on page 348, in a supposed distinction between hæmochromogen and reduced hæmatin.

The volume is profusely illustrated, which greatly adds to the value of the descriptive text, but some of the photographs might be improved with advantage in the next edition, such as, for example, that illustrating gonococci.

The book as a whole will maintain the high reputation of the author, and will undoubtedly enjoy wide popularity, and we wish it every success in its new form.

Diseases of the Colon and their Surgical Treatment. By P. LOCKHART MUMMERY, F.R.C.S. Illustrated by Coloured and other Plates, and Numerous Figures in the Text. Pp. 317. Bristol: John Wright & Son, Ltd. 1910.

A CAREFUL study of Mr. Mummery's book has convinced us that there is ample justification for considering diseases of the colon separately from those of the other parts of the intestinal canal. In its structure, its functions, and its bacterial flora, the colon presents such differences from the small intestine that corresponding variations in its diseases are only what we should expect.

Mr. Mummery is of opinion that diseases of the colon are becoming more frequent, and this he is inclined to attribute principally to modern methods of dietary, which aim at reducing the amount of cellulose in the food to a minimum, and so remove one of the chief stimuli to peristalsis and digestion.

The present exposition of the diseases of the colon, which is founded on the author's Jacksonian Prize Essay of 1909, is entirely satisfactory. If we were to select any chapters for special commendation, they would be those on the Physiology of the Colon, Normal and Morbid, on Malignant Disease, and on Chronic Colitis.

In the last named section the author succeeds in presenting a clear and intelligible description of this obscure condition, and his favourable opinion of van Noorden's principle of treatment accords with our own.

A brief description of the operations on the colon lends completeness to the work.

Contributions to Abdominal Surgery. By the late HAROLD LESLIE BARNARD, M.S., F.R.C.S. Edited by JAMES SHERRAN, F.R.C.S. Pp. 384. London: Edwin Arnold. 1910.

MR. SHERRAN has laid the medical profession under a deep debt of gratitude by undertaking the task of editing this selection of the contributions made to the literature of surgery by his friend and colleague, the late Harold Leslie Barnard.

From the short memoir, written with such force and feeling by Dr. H. H. Bashford, those of us who had not the privilege of knowing Mr. Barnard can form some idea of what his death meant to his intimates. The remainder of the volume brings home to all the loss sustained by British Surgery by his untimely death. The sections on Intestinal Obstruction and on the Surgical Aspects of Subphrenic Abscess are masterpieces of scientific investigation and exposition, and even if they stood alone, would form no unworthy monument to a worker who, when he was called hence, had scarcely reached the age of forty.

His friends are to be congratulated on the wisdom of their choice as to the form his memorial should take, and on the admirable manner of its execution.

Urgent Surgery. By FELIX LAJARE, Professeur Agrégé à la Faculté de Médecine de Paris, Chirurgien de l'Hôpital Saint-Antoine, Membre de la Société de Chirurgie. Translated from the Sixth French Edition by WILLIAM S. DICKIE, F.R.C.S.Eng., Surgeon, North Riding Infirmary, Middlesborough, &c. Pp. 617. With 20 Full Page Plates, and 994 Illustrations. Bristol: John Wright & Sons, Ltd.; London: Simpkin Marshall, Hamilton, Kent & Co., Ltd. 1909. Price 25s. net.

THE fact that the original has reached the sixth edition in a few years shows the well deserved success which this work has attained. The author truly points out in the preface that urgent surgery does not mean merely the surgery of injuries; at the present day the number of clinical conditions requiring immediate surgical action is very great. Those who are not operators themselves should at least know something of the details of the operation, and the idea of an operation being a vague and distant event, to be invoked only as a last and desperate resource, should give place to a clearer conception of the possibilities and limitations of modern surgery.

The volume under review contains half of the original work. Section I. deals with equipment, with the best plan of action in a case of extreme urgency with a complete lack of necessities, with anaesthesia—general, local, and special—and with the use of saline infusion. In the subsequent section the urgent surgery of the skull,

face, mouth, nose, eye, and ear, the neck, thorax, spine, and abdomen, including acute conditions due to torsion of pedicle and rupture of extra-uterine gestations, are considered.

The various subjects are treated with completeness, and with an abundance of illustrations which include what may be thought simple, but are none the less important details. There are also introduced through the book clinical cases, in order to show what ought to be done, and how it ought to be done.

The book is trustworthy, and will prove of value not only to those who have had little experience in the practice of surgery, but to many others.

The translation has been done in an admirable manner.

Preparatory and After-Treatment in Operative Cases. By H. A. HAUBOLD, M.D., Clinical Professor in Surgery, New York University, &c. Pp. 650. New York and London: D. Appleton & Co. 1910. Price 25s.

THIS large volume is an example of over-specialisation, and the question arises to whom it is to appeal. It is avowedly written for the practitioner, that he may be trained to make all the preparations for an operation, and carry out the after-treatment, leaving the surgeon nothing to do but bring his instruments and perform the operation. This would indeed be the surgeon's millennium, but its consummation is impossible in the present generation. Leaving out of account the author's intention as impracticable, we yet find much of value for the surgeon and nurse. The sections on the preparatory treatment, which occupy more than half the book, are written with a clear idea of the advantages and limitations of purely aseptic methods, and lucid descriptions are given of the various details. The chapters on the after-treatment, though apt to be faddish at parts, are interesting and suggestive, but except in abdominal cases they pay scant attention to the unavoidable sequels which are the frequent source of worry to the family physician. Of the 429 illustrations the majority are well chosen and clearly reproduced, but a number are superfluous. In the preface a lurid, but we hope deceptive, sidelight is thrown on present-day ethics in the American medical world. Finding that he was acting the part of a mere feeder to the surgeon, the practitioner "took his patient to the surgeon, arranged for the fee to be charged, but exacted that he be given a certain proportion of the fee in compensation for bringing the case. . . . There can be no doubt that this sort of thing has been and is constantly done."

Gall-Stones ; their Complications and Treatment. By A. W. MAYO ROESON, F.R.C.S., and P. J. CAMMIDGE, M.D. Pp. 313. Oxford University Press : Henry Frowde. 1909. Price 5s.

THE names of the authors, whose wide experience of these conditions from the operative and laboratory aspects respectively is well known, are a sufficient guarantee of the value of the opinions expressed in the book. Their views have been expressed elsewhere, but are usefully collected in this volume, which is necessarily more comprehensive than its title would indicate, as questions of differential diagnosis introduce pancreatic and other conditions not dependent upon gall-stones. The anatomy of the biliary passages, the character and composition of bile and of gall-stones, and theories as to the mode of formation of the latter are discussed. So too are the symptoms of cholelithiasis ; and in the diagnosis of stone in the common duct great importance is attached to a combination of jaundice of varying intensity, ague-like paroxysms, and pains in the region of the liver, with epigastric disturbance at the time of the paroxysm. The last eighty pages are devoted to treatment. Medical treatment, apart from treatment during an actual attack of biliary colic, is regarded as only preventive, not curative ; but, as gall-stones seem to depend on an organismal infection of the biliary passages, treatment of patients by urotropine and similar drugs during the course of such infective diseases as typhoid will probably diminish the liability to cholelithiasis. When gall-stones are present, and no relief is derived from medical measures, operation is called for, especially as the majority of cases of carcinoma of the bile passages seem to be due to the irritation of antecedent stones. The various operations are described, and it is interesting to note the reaction against cholecystectomy except in absolutely essential cases. Removal of the gall-bladder takes away the bile reservoir, deprives the bile of a large admixture of mucus, and thereby seems to cause a greater tendency to pancreatitis, and is apt to cause cystic and cirrhotic changes in the liver. "Cammidge's reaction" in the urine seems to be regarded by the authors as proof of pancreatic affection.

Public Health : Sanitary Law and Practice. A Handbook of Public Health for Students, Sanitary Inspectors, and all engaged in Municipal and Public Health Work. By W. ROBERTSON, M.D. (Glas.), D.P.H., Medical Officer of Health, Leith, and CHAS. PORTER, M.D.(Edin.), B.Sc., Barrister-at-Law (Middle Temple), Medical Officer of Health, Metropolitan Borough of Finsbury. Second Edition. Pp. 694. The Sanitary Publishing Co. May 1909. Price 10s. 6d.

THE joint-authors of this handsomely bound and well got up volume are both well-known medical officers of health—the one practising in

Leith and the other in London—and this circumstance gives an assurance that the subjects dealt with will be considered from the British and not, as so very often happens, from the purely English point of view. In Scotland, since the Local Government Act of 1889, the system of Public Health administration has been revolutionised, and with a more recent and much more efficient Public Health Act in Scotland than in the sister country more life is thrown into the work in rural districts certainly than in England.

This book has been revised and enlarged since the first edition was published, and new chapters on the Control of Tuberculosis and on Vital Statistics have been added. A considerable amount of legislation dealing with the public health has been passed since 1904 (when the first edition was published), and the book has been brought up to date in this subject. Dr. Porter is not only a medical officer of health, but a barrister as well, and no doubt his legal knowledge and training have been largely drawn upon in the sections dealing with legal questions.

The number and variety of topics which are treated of in this book show what a vast and complex field the subject of public health has become, and whether specialism is to be advocated as a general principle or not—it almost looks as if the march of events would compel a redistribution of the duties now put on one man's shoulders. Take the legal sections alone, and consider how many Acts of Parliament are there brought into play: General Public Health Acts, River Pollution Acts, Housing Acts, Food Acts, Dairies Orders, Notification Acts, Contagious Diseases (Animals) Acts, Burgh Police Acts, Shop Hours Acts, &c. In relation to these controlling Acts there have to be considered—Nuisances; smoke nuisances; offensive trades; lodging houses; tents, vans and sheds; water supplies; chemical analyses; sewage and sewers, and sewage purification; unsound food; food adulteration; vaccination; epidemics; medical inspection of school children, and so forth. To be an efficient administrator and executive officer, the medical officer of health must be in possession of general and special knowledge of architecture, plumbing, meteorology, physics, chemistry and bacteriology, and of even greater importance than any of these, he must be a well qualified medical man. Without claiming for the medical officer of health any more than that he possesses fair average abilities, it may be conceded he must carry in his head a complex medley of information.

This volume is designed to make the path easier for the aspirant to official work, and it does so admirably. No work, certainly not the crammer's "royal road," can possibly make it easy to those who have to face the ordeal of examinations, or the much more exacting test of public trial of official life. In that trial by jury the man alone who possesses tact and sound judgment, is not prone to wrath or malice, is endowed with a full measure of common sense and with full know-

ledge of his duties, can expect to win success, moderate fame, and a moderate return for his invaluable services.

This book will certainly assist students, officials and administrators in a manner not found in similar books with a like object.

A Practical Guide to Meat Inspection (WALLEY). By STEWART STOCKMAN, M.R.C.V.S. Fifth Edition, Rewritten and Enlarged. With Illustrations. Pp. 270. Edinburgh and London: William Green & Sons. 1909. Price 10s. 6d.

WE know of no manual of meat inspection which in so small a space contains so much reliable information. The three editions which rapidly succeeded one another soon after the manual was published by the late Professor Walley in 1890 testified to the high opinion which the veterinary and public health authorities placed on it. That it has gained immensely in value by the able revision of Dr. Stewart Stockman is seen by comparing this with the third edition. Indeed, so much has been added to bring it down to date, that it may almost be said to be a new book laid down on the old and familiar lines. The introductory chapter forms most interesting reading, and in the following chapters careful directions are given as to the methods to be followed in the inspection of meat. We are glad to note that Mr. Stockman is a humanitarian, and advocates the practice of stunning every animal before its slaughter. A short but suggestive chapter on Food Poisoning is contributed by Professor Ralph Stockman of Glasgow. The illustrations are numerous and helpful. To Inspectors of Food this practical guide will prove of the utmost value.

Eléments d'obstétrique. Par le Dr. V. WALLICH, Professeur agrégé à la faculté de médecine de Paris. Second edition. With 135 illustrations. Pp. 718. Paris: G. Steinheil. 1910. Price 8 francs.

DR. WALLICH's treatise on midwifery is a thoroughly reliable one, containing a great amount of information on obstetrical matters, well digested, compressed, and stated with that particular clearness and force which the French language permits. The illustrations are numerous, many of them are taken from Farabeuf and Varnier, and, by reason of their diagrammatic character, they are likely to be of much assistance to the reader. The work is divided into the three sections of *normal obstetrics* (normal pregnancy, labour, and the puerperium), *obstetrical pathology* (pathological pregnancy, dystocia, and the morbid puerperium), and *operations* (extractive operations and embryotomies). The methods and instruments described are, of course, those

in use in France, and the work is, on that account, not so suitable for the student of the British school of obstetrics; but the teacher or specialist will find in it much that is of value, and several things which he may be led to adopt as perhaps "better managed in France."

A Text-Book of Obstetrics. By BARTON COOKE HIRST, M.D., Professor of Obstetrics in the University of Pennsylvania, Gynecologist to the Howard, the Orthopædic, and the Philadelphia Hospitals, &c. Sixth Edition, Revised and Enlarged, with 847 Illustrations, 43 of them in Colours. Pp. 992. Philadelphia and London: W. B. Saunders Company. 1909.

THIS admirable work on obstetrics has now so well established a place in the good opinions of the profession and of medical studentdom that the appearance of a sixth edition calls for little more than renewed congratulations to the author and publisher. The feature of this edition is the part dealing with operations, and more especially with what may be termed the gynecological operations—those which may be rendered necessary by faulty obstetrics (repair of lacerations, correction of displacements, &c.), or by morbid processes arising during pregnancy (chorion-epithelioma, &c.). In this section are to be found details usually confined to text-books on gynecology; they will prove most useful to the obstetric specialist as well as to the general practitioner who prefers or is compelled to do his own operative work; and the operative procedures, except perhaps that for the repair of a recto-vaginal fistula, are described with sufficient minuteness to be of real service. The already numerous illustrations of earlier editions have been largely added to; but a list of them, following the table of contents, would be a great convenience. It is curious that the author should describe various ways of extracting the after-coming head and not mention Smellie's method. The extra-peritoneal (supra-symphysary) Cesarean section is not described in detail, and renal decapsulation in eclampsia is only named.

The Practice of Midwifery. Being the Seventh Edition of Dr. Galabin's *Manual of Midwifery*, greatly enlarged and extended by ALFRED LEWIS GALABIN, M.A., M.D.(Cantab.), F.R.C.P. (Lond.); and GEORGE BLACKER, M.D., B.S.(Lond.), F.R.C.S. (Eng.), F.R.C.P.(Lond.). Illustrated with 503 Engravings. Pp. 1123. London: J. & A. Churchill. 1910. Price 18s. net.

NEW editions are often described as practically new books, and in the present case the statement is true every whit. Between the sixth edition of Galabin's *Manual* and the Galabin and Blacker's

Practice there is indeed a notable difference in size, in material, and in illustration. In the years that have intervened the development of the early ovum and the diseases and injuries of the foetus have been studied in detail; the hydatidiform mole has become a matter of great importance in relation to the origin of malignant tumours of the uterus; the investigation of eclampsia has been continued with some indications that prevention, if not cure, is within sight at last; the search for some other anæsthetic than chloroform has been carried on more particularly by those who have thought that the dangers attending chloroform in surgical practice also existed in connection with obstetric cases; and a large number of cutting operations have been devised for the delivery of women possessing narrow pelves. The results of these movements (some of which are also advances) in the obstetric world are seen in the present text-book, and space is given to embryology, to scopolamine morphine narcosis, to vaginal Cesarean section, subcutaneous symphysiotomy, pubiotomy, and supra-vaginal hysterectomy, to the new theories of eclampsia, and to newer methods of dilating the cervix and inducing labour. Early rising in the puerperium is left severely alone, the authors saying, "if possible the patient should keep her bed for ten days, or for a longer time if the discharge is still sanguineous, and she should return to it if getting up brings on again a red discharge" (pp. 405-406). The treatment of eclampsia is also conservative in character—chloroform, morphia, chloral, and bromides being the chosen drugs; the emptying of the uterus is advisable if the case is at all severe. A word of praise is to be given to the illustrations of this work; they are excellent. Perhaps an arrow indicating the direction in which the child's arm is being carried would be of advantage in Fig. 401. As a whole, the text-book is one which may be safely and warmly recommended, and the publishers have as usual done their part well.

NOTES ON BOOKS.

The Principles of Hygiene, by D. H. Bergey, A.M., M.D. (Third Edition), (W. B. Saunders Company), aims at providing students of medicine with a knowledge of modern hygienic practices; to students of architecture, it affords a knowledge of sanitary requirements in ventilation, heating, &c.; to physicians and health officers it supplies a knowledge of recent advances in hygiene. That the manual seems to have fulfilled these high ideals is shown by the present issue of a third edition, and it forms no exception to the many excellent works on hygiene published in this country. It seems to us that some subjects of importance might have been treated more fully, while others

might have had less space devoted to them. Thus the important subject of the presence of lead in water supplies receives but scant notice; whereas Quarantine and the Quarantine Laws of the U.S. have required 77 pages. Surely the subjects of naval hygiene and military hygiene are unnecessary in a manual dealing with general principles.

Our experience is that infectious diseases are, one might almost say, never carried by the physician in attendance, and we fear that the elaborate precautions promulgated by Dr. A. G. Young of the Maine State Board of Health would never be carried out by practitioners in this country.

With these few remarks we have nothing but praise for Dr. Bergey's work.

It is almost inevitable that each succeeding edition of a work on chemistry should be increased in size. Five years have elapsed since the last edition of *A Manual of Chemistry*, by Arthur P. Luff, M.D., F.R.C.P., and Hugh C. H. Candy, B.A., F.I.C. (Cassell & Co.), appeared, and since then many new discoveries have been made in the science of chemistry. We have little to add to our former criticism of this volume. The authors have kept the manual thoroughly up to date. We note with approval that much greater care has been taken to explain the principles which underlie the science, and these, if thoroughly mastered by the student, make his further progress in chemistry relatively easy. We confidently recommend this volume as one well adapted to the needs of the medical student.

Sir John Moore has done well to issue a second edition of his *Meteorology, Practical and Applied* (Rebman, Limited). It has often been asked why he had not done so long before now, as sixteen years is a lengthy interval between the editions of a scientific book. Meteorology has made great advances during this period, and hence a new edition of such a work requires almost to be rewritten. This has been the case with the present volume, to which we give a hearty welcome. Much work has recently been done in the investigation of the upper atmosphere, and Sir John Moore has given an interesting and adequate account of these researches. The volume is eminently readable, and can be thoroughly recommended as a concise and trustworthy guide to the science.

Professor A. B. Johnston's work on *Surgical Diagnosis* (Appleton & Co.) is in *three* volumes, not in two, as we inadvertently stated in the notice published in the September number of the *Journal*. The price is £3, 15s. the set.—[Ed.]

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES AND NEWS.

The New Medical Ordinances.

THE presentation to the General Council of Edinburgh University of the draft of the New Ordinance in Medicine completes the Scottish University Series, and gives us the opportunity of considering them together. In the first place, we welcome the existence of this new spirit of friendly co-operation which is evidenced by the close similarity of the wording of the Ordinances, and, secondly, we note with great satisfaction the substitution of elasticity for hard-and-fast rules.

Here and there there are differences, with some of which we shall deal, but the main lines are the same, and if they do not run as far as some of the reformers would wish, we must all admit that they at least run in the right direction. All the universities accept the three-term system, and in future the curriculum will be reckoned in terms. The first professional examination remains as at present, but St. Andrews, Aberdeen and Edinburgh take power to substitute for the courses of Botany and Zoology a course of Biology. All the universities are at present decided to retain the subjects of the first professional in the curriculum, but each of them, by agreeing to accept the first professional examination of "any university of the United Kingdom," lets in the thin end of the wedge, for London University at least recognises school instruction in these subjects. This is only a matter of time, and we think it would have been wiser to have taken the power which they need not in the meantime have exercised. All the universities now place the examination in Anatomy and Physiology at the end of the sixth term, the conclusion of two years of medical study, and thus provide three years for the practical subjects.

The third professional, in *Materia Medica* and Pathology, comes at the end of the ninth term; Medical Jurisprudence and Public Health are left to the discretion of the senate; each university provides that the subjects of Medicine, Surgery, and Midwifery must be taken together. Here we come to a somewhat important difference. Glasgow and St. Andrews provide that no candidate shall be admitted to this

examination "*until the end of the fifteenth term of medical study*;" Aberdeen, "*before the end of the fifteenth term of medical study*;" Edinburgh's draft ordinance says "*prior to the fifteenth term of medical study.*"

Glasgow and St. Andrews provide that "the University Court, after consultation with the senatus, shall have power to prescribe, as a condition of recognition of any general hospital in Glasgow (or Dundee) where courses of instruction in clinical medicine qualifying for graduation are conducted, that the number of students attending a class for regular instruction at the bedside shall not exceed a specified limit." Aberdeen has long had this practice in operation, and therefore did not require to legislate: Edinburgh's needs in this connection are certainly no less urgent than those of Glasgow. Even if passive resistance should prove too strong now, it would surely be well to take, when the opportunity offers, a power which all reformers are agreed is desirable, and we earnestly hope that in the final revision the Court will introduce a paragraph similar to that in the Glasgow and St. Andrews ordinances.

The Glasgow and the Aberdeen ordinances contain ample provision for the submission of every important change to the criticism of the General Council. These provisions are significantly absent in the Edinburgh draft ordinance, and their absence has evoked a firm protest from the General Council. The Council has no desire to interfere in mere matters of detail, but it is most important that material changes in the curriculum and the examinations should not be made without being liable to criticism.

**The New Clinical
Laboratory.**

In the progress of modern medicine the investigation of many clinical phenomena, particularly connected with the circulatory and respiratory apparatus, by means of graphic methods, has yielded most important results. Careful analysis of the movements of the heart, arteries, and veins in cases of irregularity and inequality of pulsation has thrown a flood of light upon the underlying processes which give rise to such evidences of disturbance. All these modes of inquiry are developments of the application, by the brilliant and gifted Marey, of Young's graphic methods to vital phenomena. More recently the observation of the electro-motive force generated during muscular action (particularly in connection with the heart, for which we have to thank primarily Burdon Sanderson, and Waller) has begun to prove itself of the greatest value in our attempts to solve many difficult problems, and it is one of the latest developments in clinical investigation.

Some members of the Edinburgh Medical School have been able, by their own exertions, to assist the progress of medicine on such lines, but their opportunities have been hampered by lack of adequate accom-

modation and necessary apparatus. Now, through the munificence of a generous friend, the physicians to the Royal Infirmary have been put in possession of a clinical laboratory which will amply fulfil these requirements. We desire, on behalf of the entire Medical School of Edinburgh, to record our deep sense of the obligations under which the anonymous donor has laid us, and to ask him to accept our most grateful thanks for the immense services which he has rendered to the investigation of disease.

The Clinical Laboratory, which was inaugurated on 13th October by Sir Clifford Allbutt, Regius Professor of Physic in the University of Cambridge, consists of two rooms, which have been placed at the disposal of the Trustees by the Managers of the Royal Infirmary, to whom we also wish most cordially to acknowledge our indebtedness for their enlightened public spirit.

One of these rooms is entirely devoted to graphic methods, and is furnished with the most perfect examples of recording apparatus for obtaining tracings of the movements connected with the respiration and the circulation, as well as those produced by the muscular and nervous systems. All the different forms of instruments for measuring the arterial pressure are also to be found in it, and there is the most perfect modification of Einthoven's string galvanometer for estimating the electro-motive force of the heart. The other room has a beautiful installation for the use of the fluoroscope and the orthodiascope. It is, in short, to be devoted to the clinical application of the X-rays, and is provided with every means to this end.

As the Royal Infirmary is already furnished with adequate laboratories for chemical and bacteriological investigation, the new institution does not trench upon such ground; and as it also possesses an excellent electric department, the Clinical Laboratory will not usurp any part of ordinary electric work.

The Trustees of the Clinical Laboratory are indebted to the Earl of Elgin and Mr. W. S. M'Cormick, as well as their colleagues, the Carnegie Trustees, for their appreciation of the efforts being made to advance clinical medicine, and for the substantial help which they have generously provided. To them, therefore, as well as to the anonymous donor, and to the Managers of the Royal Infirmary, we feel it to be our duty to express our grateful recognition of their help.

Now that the laboratory is actually in operation, the next requisite is enthusiastic workers. In this country, unfortunately, it is difficult to induce men to settle down to scientific work, seeing the immediate rewards are small. Possibly, in the near future, the work of the laboratory may attract the favourable notice of other generous benefactors, who will endow research scholarships which will enable investigations to be carried out. If this desirable result can be attained, and if the present arrangements for the teaching of clinical medicine are

systematised and modernised, our venerable school will once more take her old place in the van of progress as regards methods of instruction in Medicine.

**The Proposed
Composition Fee.**

WE are not concerned with the reasons which have led the Carnegie Trust to suggest that the Scottish Universities should adopt the plan in force in many places of fixing a fee which shall cover the whole annual cost of university education. But we are concerned with it so far as it affects the medical students of the Edinburgh school, and if we thought it would in any way interfere with that freedom of teaching which is our own particular glory, we would oppose the proposal by every means in our power.

But after careful consideration we have arrived at the conclusion that the Edinburgh school has no reason to dread the innovation, provided that certain conditions are observed, and we believe that half a dozen broad-minded representatives of the various interests could draw up a scheme, which would satisfy all reasonable persons, in one evening's friendly conference. The only essential condition is that there should be some sort of independent clearing-house at which the student would indicate whose classes he proposed to attend: any suggestion that the whole financial arrangements should be in the hands of the University is impossible. The composition fee would not and should not cover any second courses, and we hope that it may bring about the abolition of the perpetual ticket, at least in the clinical classes. There are no perpetual tickets in any of the practical classes, and the clinical classes are the practical classes of Medicine and Surgery.

The late Dr. Stirling.

WE regret very much that the obituary notice of the late Dr. Stirling of Perth is unavoidably held over to next month's *Journal*.

Appointments.

DR. ALEXANDER MACLENNAN has been appointed Assistant Surgeon to the Western Infirmary, Glasgow. Dr. A. B. M. Thompson has been appointed Assistant Medical Officer to the Dundee School Board.

BIER'S TREATMENT BY VENOUS HYPERÆMIA.¹

By DAVID MACEWAN, M.D., C.M., Professor of Surgery,
University College, Dundee.

EIGHTEEN years ago Professor Bier recommended venous hyperæmia as a remedial measure for tuberculosis of joints. It was received at first with some hesitation, but it gradually gained a certain amount of acknowledgment, and has now a place in all our text-books as one of the resources at our disposal for combating that troublesome affection.

Not long afterwards, he announced that he had extended its application to acute inflammatory conditions. Such a form of treatment, opposed as it was to the prevailing ideas of the nature of inflammation, was received with even greater distrust than his first proposal, and it was not till the German Congress in 1906, when it received the support of some of the highest surgical authorities in Germany, that it was taken up largely by the profession.

Various estimates have been given of its value as a therapeutic measure. By some, it is regarded as the greatest advance that has been made in surgery since the memorable discovery of Lister; by others, as a matter of passing interest which is likely to be relegated before long to the domain of exploded theories; and by many, as a resource the utility of which requires to be supported by reason and experience before it can be definitely accepted.

Bier in his work on the subject, which has run through several editions, sets forth the theoretical considerations on which the method is based, and also gives an account of the results he has obtained during an extensive experience.

He starts with the teleological conception of the purposiveness of Nature as manifested in the changes which take place in the processes of disease. The Hippocratic aphorism that "Nature is the physician of our diseases" should be uppermost in the mind of the surgeon, in order that he may support and further her efforts to restore the affected parts to a condition of health. In inflammation the earliest and most essential phenomenon is hyperæmia; it is the dilatation of the vessels, and the slowing of the blood-current which enable the agents of defence to be concentrated at the

¹ Paper read before the Forfarshire Medical Association.

focus where the irritant is actively operating against the integrity of the tissues. It, therefore, follows that instead of employing so-called antiphlogistic measures, we ought rather to regard the vascular reaction as salutary, and use means to maintain and strengthen it.

As is well known, Bier employs two forms of hyperæmia—the active or arterial, and the passive or venous. This paper is concerned only with the latter, and is based on about 120 cases of different kinds in which I have used it in the Dundee Royal Infirmary during a period of two years.

Tuberculosis of Joints.—When Professor Bier commenced to deal with those cases, his practice was to keep on the constricting bandage continuously, night and day. He found, however, that the results were frequently the reverse of what he expected; disagreeable complications also were apt to occur, such as the formation of cold abscesses, the development of large granulating masses in open ulcers and the fistule of joint tuberculosis, and in some cases a violent acute inflammation. He observed that he was more successful in disease of the shoulder than in that of any of the other joints, and the reason for this appeared to be that the bandage was applied for shorter periods because of the want of room to change its position. He then tried the use of the bandage for only a few hours daily, and found that the results were more satisfactory. At present he applies it for one hour once or twice a day, except in obstinate cases, when two or three hours may be required. As a general rule, in order to avoid stiffening, joints are not immobilised, but exception is often made in the case of the knee or ankle. If abscesses form they are punctured, the pus pressed out, and a loose antiseptic dressing applied. In open and fistulous cases suction is sometimes used, either alone or in combination with the bandage.

The duration of the treatment required averages about nine months.

Bier gives his results from April 1903 to August 1904. He claims recoveries ranging from 61 to 88 per cent. with the ankle, wrist, and elbow joints. There were 13 knee-joint cases: of these 3 were cured, 2 improved, and 8 resected after a short trial with hyperæmia. Of 13 cases of tarsal joint disease 8 were cured.

Excluding the knee-joint cases these statistics are excellent, but it is very evident, judging from the meagre amount of literature bearing on this method of treatment, that in the hands of other surgeons the results have not been encouraging—in fact,

Bier himself says that in the experience of others bad results have predominated, and that as a rule the method has been abandoned as dangerous, uncertain, and ineffective. He ascribes the want of success to faulty technique, and is of opinion, that if his more recent instructions were faithfully carried out it would be found to be the best of our conservative resources. Several surgeons in Germany have reported favourably of the treatment, but records of their results have seldom been given. In the *Revue de Chirurgie* of January 1909, Chaput is reported to have treated 14 cases which were rapidly cured; Delbet in a number of cases got negative results; Arron found that in closed tuberculosis the results were nil, but in fistulous cases there was notable amelioration. Dupont, who studied the method at Bier's clinic, says that he has treated 14 cases, and that the results are mediocre and uncertain; also, that the method may be of use in open tuberculosis, but is dangerous in the closed.

In the *British Medical Journal* of 19th July 1908 there is an address by Mr. Waterhouse of Charing Cross Hospital, in which he speaks of the treatment in appreciative terms. He records 3 successful cases, but he believes he must have cured 200 within the last ten years. As he, however, combines congestion with the injection of iodoform emulsion, his results are unsuitable for the purpose of pure observation.

Dr. Wakefield, in an article on Bier's treatment (*Practitioner*, November 1908) states that he has treated 11 cases of tubercle by one or both methods of congestion, and he is convinced, from a close study of the cases, of the great value of the treatment. In support of that view, however, he only quotes 3 cases—one of teno-synovitis of the wrist that ended in improvement; another of tuberculous arthritis of the first metatarso-phalangeal joint, which was cured; and a third of tubercular dactylitis of the foot, with incomplete recovery.

In my wards in the Dundee Royal Infirmary, I had treated occasional cases of joint tuberculosis by venous hyperæmia for a good many years, but the results were usually disappointing. Other methods had to be adopted, or the patients were discharged unimproved. Considering that the want of success might possibly have been due to the treatment having been carried out in accordance with Bier's earlier instructions, I have, since visiting his clinic in 1907, submitted all the suitable cases that have come under my care to his later technique, and have used no other local treatment.

There are 10 cases in all—9 of closed and 1 of open joint tuberculosis.

The results are as follows:—

Knee Joint, 5 cases.

Recovered, 1 case. Duration of treatment, 3 months.

Unimproved, 2 cases. „ „ 6 and 8 months.

Got worse, 2 „ „ 3 and 5 months.

One came to excision, the other to amputation.

Ankle Joint, 3 cases.

Recovered, 2 cases. One synovial disease in early stage after a few months' treatment; the other with considerable stiffening in 17 months, and after the formation of a cold abscess.

Slight improvement, 1 case. Duration of treatment, 3 months.

Elbow Joint, 1 case.

Unimproved after 5 months' treatment. Excision performed.

Tarsal Joints (Sinuses), 1 case.

Recovered. Duration of treatment, $10\frac{1}{2}$ months, $2\frac{1}{2}$ by the bandage and 8 by the suction boot.

It will be observed that of the 9 cases of closed tuberculosis 3 recovered. Two of them were cases of synovial disease in the early stage, and, without doubt, the rest and general hygiene contributed largely to the result. One of the knee cases, synovial to begin with, got rapidly worse under the treatment; suppuration occurred, and, as there were indications of commencing lung tuberculosis, amputation was performed.

In the management of these cases, the impression I received was, that in closed tubercular joint disease, venous congestion gives inferior results to our usual methods of conservative treatment.

The treatment of the case of open tarsal joint disease was, however, very satisfactory. When it was commenced there were two or three suppurating sinuses leading into the medio-tarsal and other joints, and bare bone could be felt in several places. After trial of the bandage for over two months the suction boot was resorted to, at first for three-quarters of an hour daily, and afterwards at intervals of one or more days. The cure was tedious, but the only alternative was amputation. The foot is now soundly healed, and the patient is engaged at his usual work.

In tubercular disease of bone with sinuses, the suction method appeared to me to be very effective. I have 5 of such

cases on my list. One of them, a case of dactylitis, was a failure, but the other cases, comprising 1 dactylitis, 1 disease of sacrum, 1 of malar bone, and 1 of metatarsal bones, were completely successful, the duration of treatment extending from a few weeks to a few months.

Acute Inflammations.—In acute inflammation, the technique is somewhat different from that which is used in tuberculosis. The constricting bandage is applied in the same way, and well above the part affected, but it is allowed to remain on for 20 hours out of the 24. During the remaining 4 hours, the limb is elevated so as to reduce the œdema that has been produced. As the inflammation subsides, the duration of the application can be diminished to 10, or even to 1 or 2 hours daily. If suppuration occurs, small incisions are made, and a loose antiseptic dressing applied. The tampon is never used, and a drainage tube only in exceptional cases.

In localised affections, during the early stage, or when there are discharging openings, whether produced spontaneously or by the act of the surgeon, suction may be employed for 1 or more hours daily, either alone or in addition to the bandage. It is also the only method at our command when the use of the bandage is inapplicable on account of the region of the body affected.

Acute Abscess.—I have treated 44 cases of acute abscess by puncture and suction—30 of mammary abscess occurring during lactation, and 14 other abscesses of considerable size in different parts of the body. The latter series yielded successful results except in 1 case, a Lumbar abscess, due to Pneumococcal infection, in which no improvement followed 2 weeks of suction treatment, but which healed up after free incision and drainage.

The average time required for complete closure in those cases was 18 days. They could, without doubt, have been treated successfully in the ordinary way, but I think the method employed shortened the duration of the treatment, and in exposed situations prevented the occurrence of unsightly scars.

In mammary abscess, the superiority of the treatment is very evident when compared with that by incision and drainage.

In one of our modern text-books the treatment by the latter method is described as follows:—"The patient having been chloroformed, the incisions should radiate from the nipple—one or more may be needed—and these should be made with a free hand, so as to allow of the insertion of the finger and the opening up of any pockets or lobules that are distended with matter. A

drainage tube is inserted for a time, and gradually shortened day by day until its entire removal is permissible. When the chief incisions are needed above the nipple, it is often wise to make a counter opening in the lower half of the breast."

By the suction method, a general anæsthetic is not required; a small incision, $\frac{1}{2}$ to 1 cm., is made after freezing with the ethyl chloride spray. The glass is then applied and the suction kept up for 5 minutes, followed by a pause of 3 minutes, the seance lasting for three-quarters of an hour daily. After a time it may only require to be repeated at intervals of 1 or more days, according to the progress of the case. Thorough antisepsis is observed, and the part is dressed with sterilised lano-vaseline or aseptic gauze.

Three of the cases did not turn out well because of the failure of the patients to attend the hospital regularly, but all the others recovered completely. In only 1 or 2 was a second puncture necessary. The average duration of the treatment was 3 weeks (6 to 60 days).

The advantages of the method in mammary abscess are that the operation required is slight, and does not call for a general anæsthetic; there is less destruction of tissue, hence the normal form of the part is better preserved, and there are no visible cicatrices left. The only disadvantage it has, is the time required for the daily dressing, but that is a duty which can be safely entrusted to a nurse.

Acute Bursitis.—Six cases of acute suppurative bursitis were submitted to the treatment—4 of the Prepatellar bursa and 2 of the olecranon. They all did well. The average length of time required for complete recovery was 7 days.

Carbuncle.—Carbuncle can be treated either by suction, or, when the anatomical position is suitable, by the bandage. Some authorities, such as Blecher, prefer the latter when it can be used, on the grounds that it is more pain-stilling and more intense in its effects generally. Suction I consider preferable, because it hastens the separation of the sloughs when the suppurative stage has been reached. The surrounding parts should be smeared with sterilised lano-vaseline to prevent infection of the skin. It is not necessary to make incisions, removal of the necrotic plugs is often all that is required. The healing process is accelerated, and there is less destruction of tissue than in the treatment by incision.

I have treated 7 cases of carbuncle with quite good results. A large one on the back, 7 inches in diameter, was submitted to suction treatment twice daily, with the effect that the sloughs

quickly separated, and a healing condition was established in a week or 10 days.

Diffuse Cellulitis.—It has been observed by several authorities that the treatment is more likely to miscarry in cases of spreading inflammation from streptococcal infection than in localised inflammations caused by staphylococci. When we take into account the extensive and perhaps rapidly spreading area of infection, it is only reasonable to expect that during the periods of congestion, particularly when small incisions are made, the bacterial products may accumulate to such an extent as to cause an increased danger to the vitality of the tissues, and also a toxic degree of auto-inoculation in the intervals when the bandage is off. The treatment is specially apt to fail when there is involvement of the deep intermuscular cellular planes. Erysipelas occasionally occurs as a secondary complication, especially when the treatment is prolonged. It has been attributed by Brunn to changes in the lymph paths and spaces, caused by the bandage, which renders their soil suitable for infection. Brunn has seen it happen 6, Lexer 5, and Blecher 7 times.

I have had 6 cases of cellulitis—4 of the upper and 4 of the lower extremity. In one case, occurring in the upper extremity, the condition certainly got worse under the treatment, which had therefore to be given up. There was diffuse suppuration, with undermining and sloughing of the skin. The patient recovered with a very stiffened hand and forearm. Although the other cases made satisfactory recoveries, it did not appear to me that the course and duration of the disease was materially affected by the special treatment adopted.

Whitlow and Inflammation of Tendon Sheaths.—According to Bier the best test of the efficacy of venous hyperæmia is to be found in the treatment of phlegmon of tendon sheaths. The results, says Bardenheuer, are truly brilliant. When a case of phlegmon of a tendon sheath is seen early, says Bier, an attempt should be made to abort it by instituting venous hyperæmia. If it fails, and suppuration occurs, in addition to the continuance of the bandage a small incision or incisions are made in appropriate places. Drainage is not used, but the pus is pressed out daily through the small incisions, and loose antiseptic dressings are applied. From the first passive movements are employed, and the patient is encouraged to perform active movements as well. In whitlow, suction may be used by means of the finger-glass instead of, or in addition to, the bandage.

It is maintained that the treatment lessens the dangers of the extension of the inflammation, of necrosis of tendons or bones, and of subsequent functional disability.

Bier has treated 36 cases in all of inflammation of the tendon sheaths, and in 9 only did the tendons become necrotic.

The results of other authorities vary considerably. Bardenheuer got full movement in 10 out of 12 cases; Habs, in half his cases; Blecher, in 3 out of 7 cases; Manninger in 14 cases had tendon necrosis in 3; Bestelmeyer in 6 had 3; and Lindenstein in 11 cases only saved the tendon once.

I have notes of 13 cases treated in the Dundee Royal Infirmary, 6 of paronychia cellulosa, and 7 in which the tendon sheaths were involved. The former recovered satisfactorily, the duration of the treatment being about the same as by the ordinary methods. Of the latter 3 recovered with good movement, the others with considerable stiffening. In 2 there was tendon necrosis, and in another the stiffening was the result of secondary involvement of the metacarpo-phalangeal joint. In one case the distal phalanx was bare, but necrosis did not occur.

In none of the cases did the congestion seem to me to act unfavourably, but in only one of them did it have a striking effect as regards the rapidity and completeness of the recovery. In some cases it undoubtedly relieves pain, and it enables us to use smaller incisions; but, on the other hand, if incisions are not made early and in appropriate places, very bad consequences may follow. Incision, after all, is the most essential element in the treatment of whitlow, and it is very significant that in the illustrative cases which Bier gives in his work the turning-point in most of them occurred after openings had been made to evacuate pus.

Acute Inflammation of Joints.—In the management of these cases the joint is not immobilised unless there is some special indication. It is considered to be unnecessary because of the anodyne effects of the congestion in subduing muscular spasm. Active and passive movements are begun a few hours after the commencement of the treatment. If caught in the early stage, the inflammation may be aborted, but if sero-purulent fluid or pus forms in the joint, then aspiration and irrigation or incision may be required. The incisions need not be large, for pus will escape during the active or passive movements. Drains are not necessary.

The treatment is specially applicable for gonococcal arthritis. In this respect it is favourably reported on by nearly all the surgeons who have used it. In the other acute affections of joints

there is not the same unanimity of opinion, and the reports are usually of a general character and are lacking in detail. Bier, who usually gives statistics of the results of his treatment in other affections, does not do so here. He only gives reports of a few cases, and these are not very convincing as to the efficacy of the method.

My own experience is limited to only 5 cases. One of these was a gonococcal arthritis of the knee. Examination of the fluid showed gonococci. Relief of pain was experienced by the treatment, and at the end of 7 weeks the patient could walk with only slight stiffness. My other cases, which comprised 3 of non-suppurative synovitis of the ankle and 1 of the knee, ended in recovery after an average duration of treatment of 37 days. Contrary to what Bier says, there was the usual tendency to abnormal attitude, and splints had to be used to prevent it.

Bardenheuer, one of the strongest supporters of Bier's treatment, records 8 cases of joint suppuration in which the method was employed. Two recovered with complete movement; 4 with nearly full movement; 1 with stiffening; and 1 came to resection. Bestelmeyer, as the sum of his experience, gives 3 cases: 1 of an interphalangeal joint, which healed quickly but was stiffened; 1 of a metacarpo-phalangeal joint, which ended in amputation; and 1 of an elbow joint, in which the result appeared to be unsatisfactory. Wrede, out of 4 primary joint suppurations, had only 1 good result. Dr. Burnside Buchanan, who has had a considerable experience of the method in the septic wards of the Glasgow Western Infirmary, says that he was most disappointed with the treatment in arthritis. In 6 cases it had no effect; in 4 of them the results were doubtful; and in 2 amputation was necessary.

Acute Osteo-Myelitis.—I have had no experience of the treatment in this affection. Bier observes that he is not altogether satisfied with his results. In a mild case it might be justifiable to endeavour to abort it by the application of the bandage, but in cases of great intensity it would be the height of surgical folly to make such an attempt. The sooner an incision is made through the periosteum or into the bone the better, as delay in doing so would jeopardise the safety of the patient. After the infected focus has been exposed, however, the use of venous congestion is said to lessen the risk of necrosis, or if that has occurred, to hasten the separation of the sequestrum and the regeneration of the bone.

Erysipelas.—Bier reserves his judgment on the question of its

application in erysipelas, and the consensus of opinion is rather unfavourable. As already stated, erysipelas sometimes occurs as a complication secondary to the treatment in other diseases.

Septic Sinuses.—In sinuses which refuse to close, in spite of drainage and the removal of any foreign elements, I have found suction distinctly successful. I have employed it, for instance, in tubercular sinuses, sinuses following suppurative appendicitis and septic wounds, anal, fistula, &c. It may require to be carried on for some time, but the result frequently repays the trouble. It extracts any purulent fluid that may collect in the sinus, causes a free flow of lymph through its infected and infiltrated walls, and promotes the formation of healthy granulation tissue. Klapp found that the discharge from sinuses treated by suction gradually became free from bacteria. Wright's citrate and chloride of sodium solution acts on the same principle, and produces like effects by its dissolving and osmotic properties. The two may be usefully combined. In two or three cases of infected wounds, in virtue of a similar action, I have found venous hyperæmia produced by the bandage beneficial in reducing sepsis and promoting the process of healing.

Upon examining the statistics that have been published by various writers on Bier's treatment one is struck by the widely different results that are given. This may be due partly to the fact, common to all new forms of treatment, that the observer often unconsciously allows his sanguine hopes to influence his judgment in coming to conclusions. It may be due also to the greatly varied nature of the cases in regard to their intensity and general character. Wrede, for instance, points out that Bier treated 25 cases of phlegmon of tendon sheaths, in 8 of which the tendons became necrotic, but in the next 11 cases in 1 only did such a result occur. The treatment was much the same in all, and therefore the greater success in the latter series must have been due to differences in the severity of the affection.

Bier's treatment of the various affections which we have been considering is directly opposed to antiphlogosis, which he characterises as one of the most pernicious errors of our time. He does not imply that so-called antiphlogistic measures are valueless, but that any virtue which they possess is due to an effect quite the opposite of what is intended—that is to say, they produce not decongestion but hyperæmia, which is Nature's method of promoting the elimination of the infecting agent.

Although the aim of the surgeon ought to be to imitate nature,

it is equally true that she should not be followed blindly, but that her operations should be promoted, modified, or restrained, according to the effect to be achieved. The statement of Bier that the cases must be extremely rare that are not suitable for his treatment is quite unwarranted in the present position of the question. In cases where the vascular reaction is not marked, venous hyperæmia may be effectual in cutting short the inflammation, particularly at its commencement, by overwhelming the bacteria with serum from the living circulation; on the other hand, in infections of great virulence, when Nature acts with fierce and reckless energy, the hyperæmia may be more than enough for what is required. In such circumstances to increase it would be both unnecessary and injurious. Again, when the inflammation is further advanced, unless proper outlets are made for the inflammatory fluids, the very worst consequences may result from the treatment. Bier states that by its use he has been able in some cases to transform acute abscesses into cold, and finally to cause their disappearance. Such a result, however, must be regarded as a pathological curiosity and an exception to the general rule, which has been attested by clinical and experimental evidence, that the effect of venous hyperæmia in closed abscesses is to cause them to enlarge and extend. Fraenkel produced inflammations by inoculating a number of animals with the same doses of cultures of staphylococci. In some of the animals induced hyperæmia was used, while others were left alone for the purpose of control. In the former series he found that the hyperæmia did not prevent the formation of abscesses, and when they did occur they progressed more rapidly, and were more extensive than those which were allowed to run their natural course.

I consider that Bier's treatment plays its most successful rôle in cases of localised inflammation with one or more openings. Such openings provide not only for the discharge of the by-products of inflammation, but afford also a free movement and outflow for the transudation serum from the hyperæmic vessels, which, by its antibacterial and antitryptic properties, tends to antagonise and subdue the infecting and destructive agents. In closed acute inflammation, and in spreading inflammation, whether closed or not, the treatment is of uncertain value, and should be used with caution.

CONCLUSIONS. —1. Professor Bier has presented us with a fresh conception of the nature and purpose of inflammation, and has made important additions to our resources for subduing it.

2. In closed tuberculosis, venous congestion is limited and uncertain in its effects, and is sometimes productive of harm. In open tuberculosis it is comparatively safe, and yields successful results, especially when the suction method is used.

3. It acts well in circumscribed inflammation, such as Carbuncle, Abscess, and Bursitis, and gives particularly good results in Mammary abscess. It is also useful in obstinate septic sinuses. For all these cases suction is the best method.

4. It acts less favourably, and in some cases prejudicially, in spreading inflammation.

5. It gives good results in gonorrheal arthritis, but should be used with caution in joint suppuration.

6. It is contra-indicated in erysipelas, and is of uncertain value in acute osteo-myelitis.

7. It acts beneficially in infected wounds.

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THE SIGNIFICANCE OF TRANSIENT CEREBRAL CRISES
AND SEIZURES, AS OCCURRING IN ARTERIO-
SCLEROTICS.

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IN a number of affections, as uræmia, progressive paralysis, and arterio-sclerosis, there may occur cerebral manifestations of an apoplectiform or epileptiform type which are of a transitory nature. They come and go, not necessarily followed by any evidence of permanent structural damage to the brain. However, after several such attacks, at times indubitable signs and symptoms of hæmorrhage or softening may manifest themselves. This fact has long been recognised by the laity, and these seizures have been regarded by them as warnings of an impending "stroke."

The object of this communication is a consideration of these phenomena as they may occur in persons who are the victims of marked arterial degeneration. In looking over but a portion of the huge and growing literature upon the subject of arterio-sclerosis, one is struck with the scant attention which has been paid to these common and manifest signs of disturbed brain function. Such conditions do not come under observation as clinical rarities. Every general practitioner or internist of even moderate experience must have observed them frequently. Recognition of their nature is not merely a matter of theoretical interest. It is true that as a rule there is already present irreparable damage to the cerebral vessels. It is true also that an immediate and radical change in the subject's mode of life, the careful search for sources of intoxication, intestinal and otherwise, their elimination when possible, and the institution of such other measures as are indicated—all these proceedings may prolong life.

The following cases are illustrative. All but one are given briefly, only such points being mentioned as appear to have bearing upon the subject under consideration.

CASE I.—T. B., male, aged 62, retired teacher of Latin and English Literature, and an enthusiastic collector of books, prints, and *objets d'art*, consulted me in my office on the evening of 19th May 1909. His chief complaints were loss of power of left arm and leg, sensations of prickling in left hand and foot, left

homonomous hemianopsia, a puckering sensation of both sides of upper lip, and difficulty in speech. These conditions had come on suddenly on the morning of the day in question, and had followed an attack of vertigo and headache. His past history was negative, except that he had been neurasthenic for some time, and had noticed occasional œdema of the ankles after prolonged vigils. He had never used either tobacco or alcohol. He had, however, been occupied with exhausting literary labours, which had usually kept him up nearly all night. It was his habit to sit up until four or five in the morning on several successive days, and then to take one good night's rest. Somewhat refreshed, he then resumed his task. He was removed from my office to the Pittsburg Hospital, where he was kept under observation until 22nd July 1909. On admission his pulse-rate was 80; as to rhythm and force, the beat was irregular. The right brachial systolic pressure was 175. The walls of accessible vessels were somewhat thickened; there was no atheroma. The temporals were tortuous. The left ventricle was somewhat enlarged. No murmurs were present. The left pupil was slightly larger than the right. Both reacted well to light. The patient was somewhat confused—a condition which persisted for several days. Both knee-jerks were increased. There was no asteriognosis. On the morning after his admission his ocular, motor, and sensory symptoms had entirely disappeared, but his mental confusion persisted for several days. He remained in the hospital until 22nd July 1909. While there he had several attacks of tingling in the left hand and foot. With these there occurred a sensation of puckering in upper lip. There was no return of the hemiparesis nor hemianopsia. The systolic pressure ranged in the right brachial from 175 to 125; in the left, from 140 to 110. The lower figures were observed while the patient was under the influence of nitrites. There was at no time bradycardia. Usually the urine was normal. Albumen was never demonstrable, but occasionally a few hyaline casts and leucocytes were present. The intestinal digestion was poor.

Since the patient's discharge from the hospital I have kept him under occasional observation. He has been more careful as to his habits, but I have never been able to convince him wholly of the necessity of spending a sufficient amount of time in bed. He has had no return of hemianopsia, but has had occasional paræsthesiæ of upper lip, shoulders, and left foot. Paræsthesiæ of right shoulder and right half of the upper lip

are the only manifestations which he has ever had on that side of the body. During September he had an attack of left hemianæsthesia, with weakness of left leg, so that a conscious mental effort was required to take each step. The attacks were of brief duration, and have not since recurred. There is still an occasional numbness of the lip and of the left hand and foot.

CASE II.—J. A. B., male, aged 67, has marked arterio-sclerosis. Family history negative, except for the fact that the mother died of apoplexy. Patient admits excessive use of alcohol and tobacco, but denies syphilis. Has had frequent "bilious attacks," and has been constantly troubled with intestinal fermentation. Was struck by an automobile three weeks before I was called, but was not seriously injured. By this accident his lumbar muscles were made lame, but he was not forced to discontinue his work, nor did he call in a physician at that time. There were no symptoms of cerebral disturbance, then nor subsequently, until the morning of 1st October 1909, when he awoke in a dazed condition. He had partial motor and amnesic aphasia, and hemiparesis of left arm and leg. He could not see well enough to read, but could distinguish gross objects. There was no hemianopsia. The palpable arteries were sclerotic, and the pulse was of moderately high tension and of normal rate. The urine was normal. In twelve hours, with the exception of the weakness in his left leg, which persisted until the following day, all of his cerebral manifestations had disappeared. Since then he has had no recurrence of hemiparesis or aphasia.

CASE III.—J. B. L., male, aged 86. His condition was as follows:—Arteries extremely sclerotic and atheromatous; secondary cardio-renal disease; tension usually very high; never bradycardia; no history of syphilis or alcohol. He had used tobacco freely. The patient remained under my observation for nearly ten years, during which period I observed him closely. There were no evidences of progressive paralysis, and my impression was that his kidneys were adequate until toward the end, when his dilating heart failed to keep up the necessary hypertension. He suffered frequently from attacks of acute auto-intoxication of intestinal origin. Four years before his death I was called to see him in a sudden attack of hemiplegia, with loss of consciousness. Consciousness returned, however, after a few minutes; ability to move his arm and leg in an hour or so;

but he remained in a somewhat clouded mental condition during the day, and weakness of the affected side persisted for several days. For some time enunciation was poor. During the remainder of his life he continued to have minor apoplectiform attacks, the main features of which were hemiparesis, hemianæsthesia, partial aphasia, and mental confusion. These never lasted more than a few hours, and he never again had complete loss of consciousness or of voluntary movement. There were, perhaps, in all a dozen such seizures. The patient eventually died of acute cardiac dilatation.

CASE IV.—R. G., male, aged 73. Never used alcohol. Says that for years he “smoked all of the time that he was awake.” No history of epilepsy. Had always worked hard, having been railroad conductor and yard-master for fifty years. During the latter portion of this period he had been almost constantly upon his feet during working hours. His arteries showed marked arterio-sclerosis, with hypertension. His readings varied from 280 to 180. There was marked cardiac hypertrophy. His urine remained normal. During a considerable period he had had obstinate and recurring intestinal indigestion. About a year ago, after returning from a short walk, he felt suddenly dizzy. He sat down, and speedily lost consciousness. Subsequently his daughter stated that he had emitted a short scream, and that she had found him on the floor in a general clonic convulsion. This was succeeded, she said, by a period of muscular rigidity. The face was drawn to one side, and there was pulling of one corner of the mouth. Her father remained in this condition for about half an hour, at the expiration of which time he rapidly regained consciousness. The face assumed its normal expression, and in a few hours, with the exception of pain in his back, probably due to muscular strain, he was as well as before. There have since been several minor attacks of paræsthesia of the left arm and foot, with marked dizziness, but no other return of cerebral manifestations. For years the patient has complained of almost constant precordial distress. This has, however, at no time been severe. A loud, blowing, systolic murmur is constantly heard at the apex and over the entire precordial area. It is most noticeable at the aortic cartilage, but is unaccompanied by thrill, and the pulse is not small. The left heart is considerably hypertrophied. Emotion or physical exertion do not increase the patient's discomfort. There have been no vasomotor disturbances. The epileptiform attack

was, unfortunately, not observed by a physician, so the Adams-Stokes' disease cannot be positively excluded. During the several attacks of dizziness, with paræsthesiæ, which have occurred subsequently, it may, however, be stated quite positively that no evidence of disassociation of auricle and ventricle was present. At no time has the pulse-rate fallen below 68.

Time forbids a comprehensive analysis of these cases. Many interesting problems, however, present themselves for solution, such as the relative importance of the various etiological factors active in the individual patients, the varied types of cerebral seizures manifested, and the significant absence of organic changes other than those in the cardiovascular system.

It is of interest to note that none of these patients showed evidence of being afflicted with progressive paralysis. In none, moreover, could one demonstrate the presence of advanced renal degeneration or of occasional heart-block. There was no history of angina pectoris nor of migraine. Each patient, however, was the subject of marked arterio-sclerosis; each was also a sufferer from intestinal indigestion.

Evidence as to the somewhat frequent occurrence of transient cerebral manifestations in the course of arterio-sclerosis has been accumulating during recent years. Osler's¹ attention was first directed to the condition by the illness of a friend "who before his forty-fifth year was the subject of the most advanced sclerosis, with high tension. He had literally scores of attacks of transient paralysis, of monoplegia, aphasia, occasionally hemiplegia for twenty-four hours." Osler calls attention to the fact that the attacks are not always associated with very high tension. They may indeed be seen in connection with a lowered tension. The origin of such seizures will be considered in the discussion of such local cerebral conditions as may be responsible for the attacks.

The whole subject has been recently thoroughly gone over in the interesting communication on "Intermittent Closing of the Cerebral Arteries: Its Relation to Temporary Paralysis," by William Russell,² and in the subsequent discussion of Dr. Russell's paper by Lauder Brunton,³ Hobhouse,⁴ Priestley Smith,¹⁷ and others, which may be found in the issues of the *British Medical Journal* during October and November of last year. From this discussion it will be seen that such attacks are far from uncommon. It is to be hoped that further clinical observation will throw additional light upon these interesting phenomena.

Since the present discussion must be limited, it has seemed best to confine it to certain generalisations as to possible transient conditions in the brain which might call forth these cerebral manifestations in arterio-sclerotics, and, if possible, to draw some conclusions therefrom which might be of prognostic or therapeutic value.

The local pathological condition must be transient, since its effects are so fleeting. Recovery from a cerebral hæmorrhage, thrombosis, or embolism is not so rapid, and is apt to be less complete. Our knowledge of the physiology of the brain is imperfect, so there must be many guesses and wide gaps. It is certain, however, that more than one factor may be at work in any of these cases. The patients have sclerotic cerebral vessels, but they have also sclerosis of other organs; an apparently normal urine does not necessarily mean a normal kidney; the general ability to destroy toxins is diminished; the tendency to produce them is increased. Admitting, then, the narrow limits of our knowledge, and the complexity of the subject, we may consider as some of the possible causative factors: the action of a toxin upon brain cells in localised areas; a spasmodic, localised contraction of cerebral arteries, sufficient to interfere with the function, but not to affect the integrity of a part; so considerable a decrease in a compensatory hypertension that certain areas of the brain are temporarily insufficiently supplied with blood through the sclerotic vessels which supply them; localised areas of œdema in the brain substance.

It may, I think, be permissible, in the light of our present knowledge, to assume without discussion a toxic basis as the underlying factor in all, or most, of these conditions. The toxic substances may never appear in the blood under normal conditions, on the other hand they may be habitually present in relatively minute quantities.

The supposition that the condition is due to a localised poisoning of brain cells is that which Tanzi⁵ invokes to explain the closely allied, if not at times identical, seizures of progressive paralysis. "These are capable of being regarded as manifestations of irritability or exhaustion, associated with a morbid action which is temporarily localised in certain cerebral areas." If, as surmised by Lugano,⁶ the neuroglia acts as a protective barrier between the nerve cell on the one hand, and physiological and exogenous toxins on the other, it may further be inferred that some temporary interference with the protective function of the neuroglia

may precipitate cerebral manifestations, just as an interference with the activity of the liver may break down the barrier between the poisonous formations in the digestive tube and the general circulation.

Arterio-sclerosis produces a profound alteration in the ability of the organs to resist fatigue and disease. It is not surprising therefore that a brain with damaged vessels should be particularly subject to those localised alterations of function which result from a state of intoxication poorly resisted, if at all.

A simpler factor which may be present, in many instances, as the chief or sole cause of functional disturbance, may be an intermittent closure of the blood-vessels supplying the affected area. This is a theory which has been especially worked out by William Russell, and his views are fully presented in his text-book⁷ and in subsequent articles.^{8, 2} This local vessel spasm may be an important factor in certain allied conditions. Thus Osler,¹ in discussing three cases of angina pectoris with transient aphasia or paralysis during the seizures, says: "The paroxysms are suggestive of intermittent closure of the vessels, particularly when one considers the similar attacks in Raynaud's disease, and the frequency of such a transient paralysis in arterio-sclerosis.

The circulation of the brain is not affected, except indirectly by the vasomotor centres in the medulla. Cushing⁹ has shown experimentally, that the action of this centre upon the cerebral circulation is by the constriction of the vascular fields of other portions of the body, which raise tension, as a whole, in order that an anemic medulla may be supplied with blood. The anatomists had already prepared the ground by a histological demonstration of the presence of vasomotor elements in the vessel walls; but at the time of Cushing's work experimental evidence of their presence had baffled physiologists.

The exact location of such centres is still undetermined, but investigation has seemed to show that the cerebral vessels do contract and dilate in response to stimuli received from some independent centre or centres of their own. Thus Weber¹⁰ claims to have proven that there are six kinds of nerve fibres which influence these arteries, namely, constrictor fibres in the cervical sympathetic, constrictor fibres through the finer connections between the lateral sympathetic chain and the cerebral vessels, dilation fibres between the lateral sympathetic chain and the cerebral vessels, and dilator fibres through the cervical sympathetic, the cervical cord, and from the cortex. By irrita-

tion of these fibres there ensues a contraction or widening of the cerebral vessels without alteration in the general blood-pressure.

Such vessel control, as a result of nerve stimuli, would indicate the presence of certain centres from which the impulses must be modified and distributed. Since it is a well-known fact that arteries may contract as the result of a local action upon the vessel walls of substances which may be present in the circulating medium, the ability of the vessels to contract would not, however, be disproven even if evidence as to the presence of a local vasomotor system were negative instead of strongly positive. Such substances, to mention well-known examples, are ergot, digitalis, adrenalin, and, in some subjects, nicotine.²

Upon clinical grounds, Sir Lauder Brunton³ arrives at the conclusion that such independent contraction may occur, and he refers to observations upon migraine in his own person, which he published in the *Journal of Medical Science*, April 1902. From these he reasoned by analogy that, as his temporal artery was as hard as a piano wire during the attack, the cerebral arteries might be affected in a like manner. He refers to the alterations in the senses of hearing and of smell, and to the aphasia and the homonomous hemianopsia which often accompany migraine, and which he regards as occurring as the result of such vessel contraction.

Adami¹¹ admits that the indications are that a prolonged extreme contraction of the arteries of individual areas of the brain is not an uncommon condition. He objects, however, to Brunton's conclusion in regard to bilious headaches, since in these states there is not merely a local but a general vascular crisis with rise in peripheral blood-pressure. In discussing this general hypertension, he concludes that it is possible that certain products of imperfect metabolism or other poisons act generally upon the arteries, but that the direct action of the same on the vasomotor centres would equally explain the condition.

Sir Lauder Brunton's (*loc. cit.*) clinical analogy, while not conclusive, is made more striking when we consider the frequent co-existence of the evidences of transient local impairment of brain function with conditions of local arterial spasm other than of the temporal artery. In connection with Raynaud's disease, there may be anæsthesias, aphasias and transient loss of consciousness. In spasm of the retinal arteries there may be giddiness, syncopal attacks and migraine (Weber and Gruber¹²).

Finally, in migraine itself, in rare instances, we may have

marked disturbances upon the motor side. In an interesting history of a migrainous family communicated to the *Brit. Med. Journ.* by J. Mitchell Clarke,¹³ such an association was constantly manifested. In this most marked instance the influence of heredity was striking. Nine members in three generations had suffered with migrainous attacks in which hemiplegia, usually accompanied by motor aphasia, was a constant feature. In one instance there occurred paralysis of all four extremities, together with that of the muscles of the neck. The motor disturbances, and in some instances hemianopsia as well, were invariably phenomena of the aura. Gross cerebral disease, family periodic insanity, epilepsy and hysteria could be satisfactorily excluded. The important connection between attacks of migraine and the cerebral seizures of arterio-sclerosis is that both are brought on by an accumulation of autogenous toxins. These may act selectively upon certain neurones, or upon local areas of vessel wall, or upon certain vasomotor centres; perhaps even in other ways. One point at least may be regarded as definitely determined, and that is, that there is a marked analogy between the method of production of the migrainous storm and of the transient manifestations of arterio-sclerosis and of certain allied conditions as well, and that both are induced by a process of auto-intoxication.

The contention that vaso-constriction in localised areas may, in certain instances, produce transient cerebral seizures is upheld by the facts which have already been noted in connection with localised vessel spasm. That this takes place with especial frequency in arterio-sclerosis is rendered probable by the fact that a diseased hypertonic artery responds to stimuli not only as actively, but even more vigorously than does a normal artery.^{7,1} The results of the investigations of Pässler and Heinicke upon experimental kidney lesions are of interest in this connection. These observers noted that during the permanent rise of blood-pressure which followed partial removal of the kidney, an arterial spasm with a further increase of pressure resulted from slight stimuli which, in normal animals, would produce no reaction whatever.

A third etiological possibility is suggested by Miller.¹⁴ This observer reports a case in which by means of baths the blood-pressure was reduced 25 m.m.; thereupon the patient developed left-sided transitory numbness. The baths were continued, and his pressure finally remained at about 190, which was 30 m.m. below his usual reading during the four preceding years. The

patient then developed repeated transitory hemiparesis with numbness. The sweats were discontinued; the attacks ceased. Miller states that like disturbances have followed the use of vasodilators, and explains the condition by assuming that only when very high pressure was maintained, could the brains of these persons be sufficiently supplied through the narrowed vessels.

It may be assumed, finally, that in certain instances transient cerebral manifestations such as recurrent hemiplegias and migraines may be due to localised cerebral œdemas. A case of angio-neurotic œdema was reported by Osler in which such manifestations occurred. Except in the rarest instances, it appears to be improbable that such a cause should be active in connection with arterio-sclerosis.

The importance of an appreciation of the nature of these cerebral crises rests upon the fact that in arterio-sclerotics there are, as a rule, signs of serious involvement of the cerebral arteries, of a marked toxæmia, or of both.

William Russell has pointed out that vessel spasm, if present, may predispose to the formation of thrombi or of apoplexies, at the proximal side of the contracted vessel. On the other hand, the general vascular tension may be too low, even with a high reading, and the indication may be to stimulate the heart. In any case, we should institute measures which have as their aim the detoxication of the individual, and the reduction or raising of his internal pressure to a point at which his organs can best perform their function. Lauder Brunton¹⁵ has formulated excellent guiding principles for the treatment of abnormal tension, and issues timely warning of the danger of a routine conception of the pressure which may be desirable in a given individual.

Further, in order that the best treatment should be applied, it is essential that the physician should possess a thorough clinical as well as pathological knowledge of the disease, and that he should be conservative and patient. He should not consider the clinic only through the microscope. He should preserve rational scepticism as regards the value of vaunted drugs, baths or sera. He should remember that "a therapeutic victory is a daughter of time," and is won not only through the changing views of pathological anatomy and the uncertainties of experimental pathology, valuable and suggestive as the results of such studies may be, but primarily through observations upon living subjects.¹⁶ Only those investigations, the results of which are in accordance with such studies will, or should, endure.

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CONGENITAL DEXTROCARDIA. COR TRILOCULAR BIVENTRICULAR.¹

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THE aim of the present paper is to describe a case of congenital heart disease which showed the above characters, and in which a confirmatory post-mortem was obtained. Thereafter it is proposed to discuss the details of the case, and to pass in review such matters as seem to arise from these individual characters, as well as to note their bearing on each other and on their etiology.

The patient in question died at the age of $2\frac{1}{2}$. His life-history until two months previous to his death was as follows:—

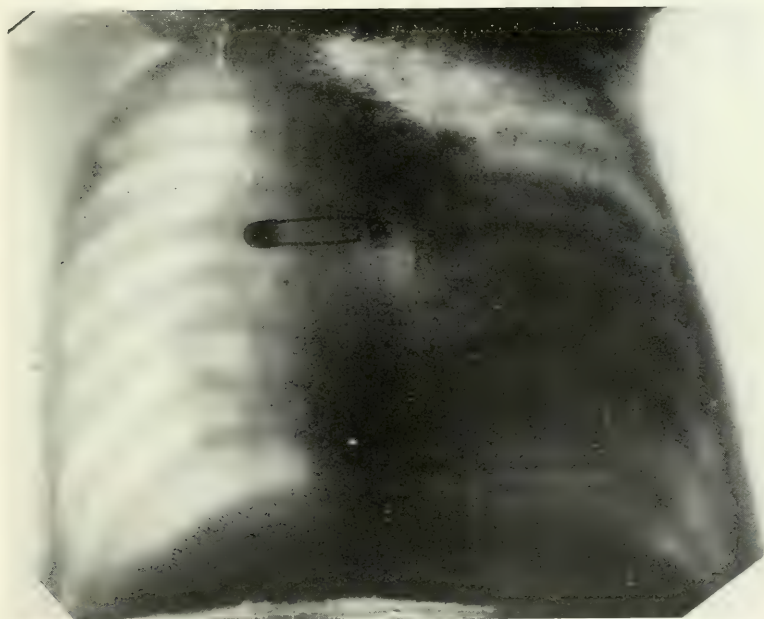
He is a boy of $2\frac{1}{2}$, who has suffered from this cardiac anomaly since birth.

His parents are healthy, and show no evidence of rheumatism, heart disease, or syphilis. They have one other child, a healthy girl of 5. The great-grandfather, the grandfather, and two grand-aunts—all on the maternal side—suffered from heart disease. The father's brother had rheumatic fever at the age of 7 and was subsequently ill with heart disease until the age of 15, when he died of heart failure. There is thus very complete evidence of the tendency to rheumatic and cardiac affections on both sides, although as yet the child's parents have escaped.

The child was born at full time in the normal way, but it was noted from the first that he was suffering from some cardiac affection. For the first day or two he was semi-conscious, did not cry much, and looked as if he would not survive long. Gradually he came to himself, although even then signs of dyspnoea showed themselves. The first year of his life was one long struggle for existence. Dyspeptic and bronchitic troubles were added from time to time to his heart affection. After much experimenting, a suitable dietary was hit upon, and thereafter a slow but yet decided improvement set in, although not a few relapses occurred. Fainting fits were frequent in the earlier months—generally of short duration, but at times lasting for half an hour. These "turns" varied greatly in character, from a slight unconsciousness with cyanosis to a more evident fit with general stiffness of the

¹ A thesis for M.D., Edin.

PLATE I.



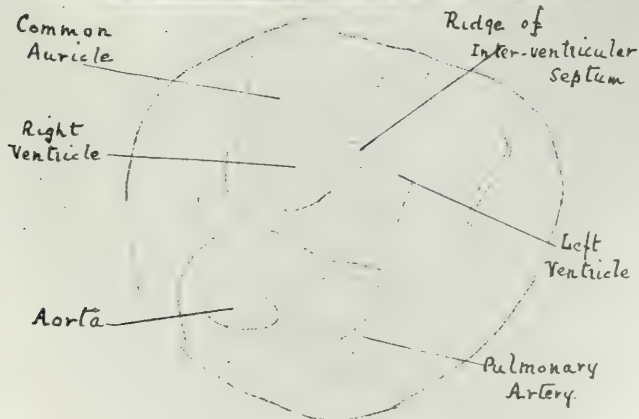
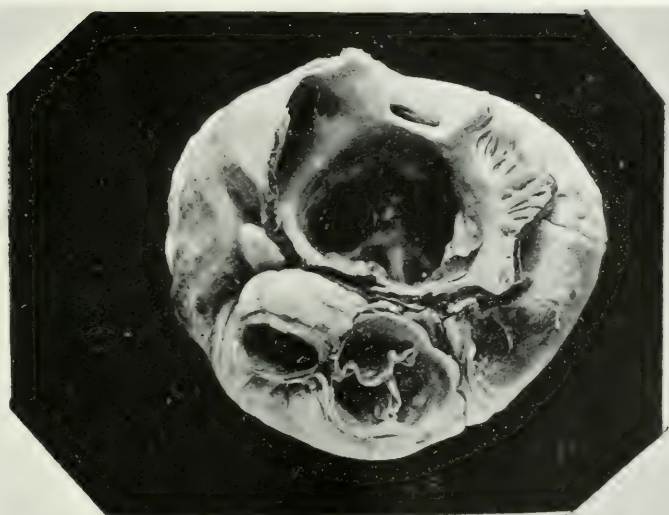
Left.

View from behind.

Right.

X-ray photograph of child's chest (taken when about two years old). There has been some movement, but there is a quite evident dark area in the site of the right-sided heart. The axis of the heart is directed downwards and to the right. The diaphragm shows much the same level on the two sides.

PLATE II.



Photograph of Child's Heart showing
relations of parts.

Child's heart (from photograph by Mr. D. M. Greig).

limbs. In time these ceased almost altogether, but with teething they were again called forth. His second year was much freer from such incidents. He now began to grow rapidly in length, though there was very little gain in weight. Speech came early, but he did not walk till 2 $\frac{3}{4}$ ths. The cardiac condition remained unchanged.

At the age of 2 $\frac{1}{2}$ ths he is now a poorly-developed child and distinctly under weight (26 lbs.). There is slight rickets with beading of the ribs and transverse constriction of the chest. He takes his food well, runs about a little, and seems fairly comfortable. At the same time he has an anxious face with slightly distended veins on it. He is quite active and bright. There is a little cyanosis about the lips. The veins in the neck are full and prominent. There is slight clubbing and congestion of the fingers and toes. His mother has noted that his finger and toe nails, and also the hair of his head, show a more rapid growth than usual. There is no œdema anywhere. The veins over the front part of the chest are distended.

The pulse is 100, small and regular. There is evident pulsation over the right side of the chest. It is chiefly marked in the 5th and 6th interspaces, just below the right nipple. To palpation it feels strong, regular, and forcible. There is no accompanying thrill. The pulsation is widely felt over the chest. There is pulsation in the vessels of the neck just following this pulsation of the presumable apex beat. The epigastrium shows a pulsation synchronous with it. There is no pulsation over the left side of the chest.

On percussion the limits of the heart are seen to be—(1) upper border at second rib on the right side; (2) right border midway between right anterior axillary line and right nipple line; and (3) left border at the right sternal edge. The lower border blends with the underlying liver (see diagram, p. 430). On auscultation the main feature is a loud, rough, systolic murmur replacing the first sound. This murmur is heard all over the heart area, and outwards into the right axilla. Its maximum point is at the apex beat. The second sound is loud and accentuated, but of late it seems to be replaced by a diastolic murmur.

An X-ray photograph of the chest shows the right side of the chest with a dark shadow corresponding to the heart on this side. This dulness extends upwards to the level made out by percussion, and blends below with the liver. There is no change in the level of the diaphragm on the two sides (see X-ray photograph).

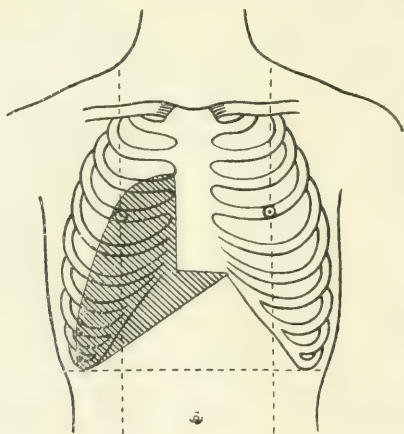
Over the usual heart area there is absence of apex beat and the note is resonant, while on auscultation there is merely heard the conducted weakened sound from the right side.

The respiratory system shows no abnormality. The respirations are 40 per minute. There are now no bronchitic sounds. There is some indrawing in the supra-clavicular fossæ.

Digestion is now good. The liver is in its usual place, and is not enlarged. The spleen is not palpable.

The urine is normal.

In brief, the child is a clear example of dextrocardia of congenital origin without transposition of the other viscera, *plus*



indications of cardiac disease, or much more likely, cardiac defect. This, then, is the record of the child's condition two months before death. There then seemed the promise of a year or two of life, but the onset of whooping-cough, with bronchitis and convulsions, brought about death at the age of $2\frac{1}{2}$.

A partial post-mortem showed the liver in its normal position on the right side. The heart and pericardium were situated on the right side, and stretched from the mid-sternal line to the right of the nipple line. The pericardium and the diaphragm were intact. There were no signs of adherent pericardium. The lungs were congested. There was a slight amount of fluid in the pericardial sac, but no adhesions were present. The heart lay with its axis extending from above, and at the sternum downwards and to the right of the right nipple and below it. The heart was enlarged. There was one common auricle without any trace of

division into two. There was one auricular appendix—the right. The auricular wall was smooth. Both ventricles were dilated and hypertrophied. Both mitral and tricuspid valves were incompetent. There was a distinct vestibule leading from the common auricle to the ventricles. There seemed a deficiency at the upper end of the interventricular septum, but there was a distinct line of septum below, marking off the two cavities quite sharply. Both the aortic and pulmonary valves were competent. The front part of the heart and the greater part to the right was made up of right ventricle.

The case-record just outlined presents for consideration two things—(1) the heart defect, and (2) the heart displacement.

The Heart Defect.—The condition described in this heart represents that type of heart defect which is known by the name cor triloculare biventriculare. Ziegler (*Special Pathological Anatomy*, 1896, sections i.-viii.) mentions in detail the different names applied to hearts with septal defects. The three-chambered heart may be formed with one auricle and two ventricles, as in this case, when it is called the cor triloculare biventriculare, or else it may have one common ventricle and two auricles, when it is designated the cor triloculare biatriatum. Both are rare, and both are only found occasionally with such a complete absence of the septum as justifies the definite name. In short, the tendency for all these septal defects is to vary so much in the actual defect as to prevent the occurrence of any pure type. They always tend to pass from one to the other, so that one may have as the slightest degree at one end of the scale a patent foramen ovale up to the complete absence of the septum, as in this instance.

The number of recorded cases of cor triloculare biventriculare is but limited. The examples that I have met with are:—

1. Fussell, M.H. (*Med. News*, 3rd November 1888), describes a case in a child aged 20 months who had a partial dislocation of the abdominal organs. There was no septum between the auricles, and the ventricular septum was incomplete at the upper edge. There was only a common atrio-ventricular ostium for both ventricles.

2. Probyn-William (*Journ. of Anat. and Phys.*, vol. xxviii., part iii., pp. 305-308, 1894), under the title, "Unusual Malformation of the Heart," gives the report of a full-time infant who was cyanosed from the first, and who only lived one month. The apex of the heart was recognised during life as being to the right of the sternum. There were no murmurs. A patent foramen

ovale was suspected. The post-mortem showed a heart of normal size with an apex to the right of the mid-line. There was one auricle about the size of the two together. There was a small septum from the middle of the upper part of the posterior auricular wall, evidently an abortive attempt at septal formation. The auricle was separated from the ventricles by a vestibule common to the three cavities, and at the bottom of it there was the ridge of the inter-ventricular septum with openings on either side into the right and left ventricles. There were also various anomalies of vessels.

3. Ewald (*Berl. klin. Wochenschr.*, No. 47, pp. 1044-5) describes the case of a man, aged 42, in whom he diagnosed a heart defect. The heart was dilated. Systolic and presystolic murmurs were present. There was distinct local cyanosis especially marked on the cheeks, ears, and the fingers. A post-mortem showed a complete absence of the septum of the auricles and dilatation and hypertrophy of both ventricles. The patient's father and also his brother had had heart disease. Only 3 or 4 with such a defect had reached the 40-50 decade. Hansemann in the subsequent discussion referred to a like heart in a man of 62.

4. Langer (*Prag. med. Wochenschr.*, 1899, No. 8) describes a very typical case in a patient with total transposition of the viscera.

5. Théremin (*Etudes sur les Affections Congénitales du Cœur*, p. 154, and figs. 229-231, 1895) describes and figures a heart with complete absence of the auricular septum. The common auricle communicated with the two ventricles by a large opening separated in the midst by the septum of the ventricles.

The conditions found in all those cases can only find their explanation in a consideration of the manner in which the septa are formed. Keith (*Human Embryology and Morphology*, 2nd ed., 1904, p. 287) mentions how, during the latter part of the first month and the opening of the second, the auricular part of the heart becomes separated into right and left chambers by the formation and union of three septa:—(1) The endocardial cushions; (2) the septum primum; and (3) the septum secundum. In the case of the pure type of cor trilobulare biventriculare there is a complete arrest in the development of these three septa, and therein is found an explanation of the common auricle and also, as has been shown lately, of the common vestibule leading to the separate ventricles. A partial arrest can give a very varied anatomical type of defect of which the abortive septum in

Probyn-William's case is an example. These embryological data thus give a full and adequate account of the conditions found in these hearts where there is this type of septal defect and no complicating valvular involvement. The slight gap at the upper end of the interventricular septum is chiefly due to the absence of the endocardial cushions which go to form it.

As regards the *clinical* picture in these cases, it is difficult to lay down any definite rule, as it is just hearts such as these that so often show valvular lesions, which may of course give rise to signs that mask or at least complicate those produced by mere septal defect. Cyanosis seems to be the only sign that gives a suggestion of their presence. This cyanosis, too, seems in some cases only to develop in later life either after some bodily or mental strain or else without any special cause. Such is the opinion of Ewald, who, in discussing his case, lays special stress on the local character of the cyanosis.

The *physiology* of these hearts with such defects is somewhat obscure. It is presumed that there are two streams of blood running side by side, and that there is very little mixture taking place except at the points of contact along the edges where the two columns of blood are in contact.

The Displacement of the Heart.—The displacement of the heart to the right which this patient shows seems well worthy of detailed consideration, as the number of cases of like nature is as yet but small and their nature is by no means understood. These right-sided displacements may occur from various causes and at various periods in the life-history of the organism. They may be part of a general transposition of the organs of the body in which there is a complete reversal of the two sides of the body and of the parts of the individual organs. This constitutes *situs viscerum inversus* or, as it is also called, *heterotaxia totalis*. On the other hand there may be a transposition of the contents of one cavity, either thorax or abdomen, when there results a partial *situs viscerum inversus*. There are also not a few transition cases, such as the one mentioned by Abernethy,³ in which there was, along with an almost complete inversion of the thoracic organs, a liver situated in the middle line. Still more curious and difficult to classify are cases such as that lately described by Royer and Wilson (*Brit. Journ. of Children's Diseases*, vol. v., pp. 176-8), in which there was a complete transposition of all the organs of the chest and abdomen except the heart, which, however, was full of pathological faults.

Our knowledge regarding displacements of the heart has only

grown very gradually. There is very little to be found in literature until about the seventeenth century, but by the beginning of the nineteenth century there were isolated communications and even attempts to collect the recorded cases, as was done by Breschet.⁸ The early cases were naturally mostly post-mortem records, and it is only about the middle of the century that clinical records began to appear. Schrötter¹⁷ in 1870 reported a case and reviewed the subject. The study of the always attractive subject of general transposition of the viscera helped greatly in bringing to light the lesser transpositions, and in Küchenmeister's²⁵ work on this subject there was much indirect and often critical consideration of these isolated cases of inversion. Even before this Krieger¹⁹ had been able to collect 16 cases of what he believed to be examples of this isolated dextrocardia. Withal there was a want of definition of the real meaning attached to the word dextrocardia. Lochte⁵⁰ in 1894 discussed the whole matter afresh in a frankly critical manner, with a resulting diminution in what he considered true cases. At the same time he advanced new theories regarding its causation. Since Lochte's paper the stream of communications has continued, but it is questionable if any great progress has yet been made. There have not been any fresh reviews of the subject excepting a short but comprehensive paper by Löwenthal⁷⁰ in 1900 and a recent careful survey by Aufdermauer.⁸⁹

Congenital dextrocardia may be defined as the name applied to a displacement of the heart to the right side in which, as in general transposition of the viscera, there results a mirror image of the heart corresponding to that on the left, with at the same time a complete reversal of the vessels and the cavities of the heart. Now while this is the ideal definition which it is evident later observers have in their mind, it is very questionable if any of the cases yet reported can be adduced as examples of this true congenital dextrocardia.

It is difficulties such as these that have led me to attempt to pass in a comprehensive review the varied kinds of cases that have been so designated, in the hope that some kind of order may be evolved. It is first of all necessary to set aside all those cases in which the dextrocardia is part of a general transposition, and confine one's attention entirely to displacements of the heart only—the isolated dextrocardia of the Germans, the pure dextrocardia of the French.

These isolated or pure dextrocardias may be found under varying circumstances and at different times in the life-history

of the organism. The classification that commonly holds good is into congenital and acquired, but many facts go to show that a much more elaborate division must be made if one is to be able to appreciate the many difficulties that arise in the diagnosis and etiology of true dextrocardia. Acquired dextrocardia of post-natal life does not directly come into consideration in this paper except in relation to the diagnosis of the congenital form. Even, however, in connection with congenital dextrocardia it is very advisable to consider and classify the many cases that have been reported as such, although it is very likely most of them will have to be rejected as untrue examples of the condition. These congenital dextrocardias may be due entirely to changes in the heart itself, or else they may have been influenced by changes in neighbouring structures. There are thus separated out two distinct groups of displacement, one due to intrinsic changes and the other to extrinsic.

GROUP I. *Extrinsic*.—It seems well to consider in the first place the group of congenital dextrocardias due to extrinsic or external causes. This type of dextrocardia corresponds largely to the acquired cases of postnatal life. Not a few of the cases reported as congenital dextrocardia come under this heading. They are certainly much more cases of dislocation of the heart, and ought more properly to be called dextroversio cordis, as is now being done in some cases. They differ in their origin from the true dextrocardias of intrinsic origin, and also show in their subsequent history many points that help to still further separate them.

These extrinsic cases can be classified according to their cause in the following way:—

1. Cases due to changes in the lung.
2. Cases due to diaphragmatic herniæ.
3. Cases due to antenatal inflammatory conditions leading to displacement from adhesions, as in the acquired cases of later life.

1. *Lung Change*.—(a) The first cause of right-sided displacement is complete absence of the right lung, as in cases reported by Meckel⁷ and by Maschka.¹⁴ In Maschka's case the whole of the right pleural cavity was filled up by the heart. Allied to this is the partial absence of the right lung, as in a recent case reported by Berliner;¹³ in which there was a dextroversio cordis with non-formation of the upper and middle lobes of the right lung.

(b) A curious cystic transformation of the lung has in occasional cases given rise to dextrocardia. Krieger,¹⁹ in his important thesis on congenital dextrocardia, describes such a case in which the subsequent post-mortem showed the presence of this condition in the right lung, and thus excluded it from the category of true dextrocardia. These cystic lungs suggest clinically bronchiectatic cavities and show pathologically a cystic formation in the lungs with absence of pigment. Carpenter²² has recently published with illustration a case in which a large cystic left lung appeared to have led to a dislocation of the heart to the right. Kreisch,⁴² in a case with dextrocardia and lung conditions suggesting this condition, attempts to argue its presence.

(c) There may be malformation of the lobes of a lung leading to enlargement of a lung and displacement of the heart. This occurred in a case reported by Krönig,⁶⁶ in which the left lung was so affected. The dextrocardia was diagnosed during life. There were no heart anomalies beyond this.

(d) There may be atelectasis alone, or else it may be along with misplacement. Such a case is that of Perregaux,⁵¹ in which an eight-month child with dyspnoic attacks was found to have its heart beating in the 6th right intercostal space in the nipple line. There were no murmurs heard over the heart. Breathing was almost completely absent over the right side. A tumour of the mediastinum was suspected. A subsequent post-mortem by Morestin⁵² showed the heart in the right side of the chest and the right lung flattened and misplaced.

2. *Diaphragmatic Hernia*.—This has long been recognised as a cause of lateral displacement of the heart to the right side, when the hernia occurs, as it usually does, on the left side. Stokes, in 1854, in his book on *Diseases of the Heart and Aorta*, mentioned the condition as being most common in new-born infants who only lived a short time, but also cited examples to show its presence was not incompatible with a considerable duration of life. Thus, in a case of Weyland quoted by Bouilland, the child, which lived for seven years, although liable to continual vomitings from the first period of its existence, showed post-mortem the left side of the chest as high as the 2nd rib filled with the convolutions of the intestines and the lung only one-sixth of its ordinary volume. The heart was situated in the middle line. Two others are cited, in one of which, from Cruveilhier (17th *Livraison of his Pathological Anatomy*), the patient, a woman of 65, had the heart completely displaced to the right. Like cases

have been reported by Alexander,¹⁰ Guttman,³¹ and Bailey.¹⁶ Lately I had the opportunity of seeing a new-born infant which showed a distinct dextrocardia, the whole heart being to the right of the middle line. The heart sounds were normal. The child breathed quickly and seemed dyspnoic. There were no abnormal sounds heard over the right lung. On the left side there was dulness, and the heart sounds were absent. But for the age of the child one would have suspected pleural effusion on the left side. An X-ray photograph showed a dulness on the left side of the chest. In view of the age of the child the case appeared due to some mediastinal tumour. The child only lived a few days, and at the post-mortem the heart was found on the right side, while the whole of the left side of the chest was taken up by liver and intestinal coils which had entered by a hernia in the left side of the diaphragm. Ballantyne (*Antenatal Pathology and Hygiene*, 1904, pp. 477-487), in a review of 100 recently reported cases of congenital diaphragmatic hernia, states (p. 483) that in 9 the heart was pulsating and displaced to the right. It is thus abundantly evident that the possibility of such a cause of congenital dextrocardia must be kept in mind.

3. *Antenatal Inflammatory Conditions*.—There seems to be no doubt regarding the existence of these, and of course if these inflammatory processes affect the right pleura and lead to adhesion between it and the pericardium, the possibility of displacement such as occurs in the acquired dextrocardia of later life is evident. In such cases congenital dextrocardia may be diagnosed when they really are cases of dextroversio due to inflammatory processes occurring during fetal life. Unless one had a very clear record of an infant's health, especially during its early years, it would be difficult in later years to estimate and name correctly a dextrocardia discovered in later years, and even a post-mortem examination might only confirm the presence of an acquired displacement without helping to settle whether it was antenatal or postnatal in origin. Thus Cooper¹¹ in 1836 described the case of a child with distinct dextrocardia, the sequel of a right-sided pleurisy, probably of fetal origin or else occurring in the first days of life. The child was cyanosed, but lived 10 months. Küchenmeister (*op. cit.*, p. 244) mentions the more convincing case of a lithopædion with the heart to the right, and with adhesions between the right lung and the pericardium.

This concludes a survey of the chief factors at work in the production of cases of dextrocardia due to extrinsic causes.

Paltauf⁷⁶ especially pleads for this type of dextrocardia being designated dextroversio. With post-mortem findings their definite nomenclature is easy, but without that many of them pass as cases of true congenital dextrocardia.

GROUP II. *Intrinsic*.—The second great group of cases of dextrocardia consists of displacements of the heart, without any evidence of such disease, defect, or malformation in neighbouring structures as might cause this lateral movement. This group includes all the cases which everyone recognises as true congenital dextrocardia. These cases may have been discovered only post-mortem, or else they may have been diagnosed during life and confirmed after death, or lastly, their supposed nature may only rest on a clinical basis. There are thus set out for consideration these three kinds of cases:—

(a) Cases found only at post-mortem. This group of cases is formed mostly by the earliest recorded cases, before physical diagnosis had taken its place in the examination of the sick. The list of such cases is not a large one, if the exclusion of cases of total transposition of all the viscera, or even of cases with partial transposition of abdominal viscera, be rigidly adhered to. There would thus be set aside the case of Möllenbrok,¹ where the stomach lay to the right, as well as the oft-quoted case of Sampson,² where the liver lay in the left hypochondrium and the spleen in the right, as well as the transition case of Abernethy,³ where the liver lay in the middle line, and even some others, where the absence or meagreness of the reports regarding the position of the abdominal organs debars them from inclusion here. The earlier recorded cases centre around the names of Otto and Breschet, but at the present time rigid criticism of these by many observers has done much to limit their numbers. In one case of Otto's⁵ the heart merely lay a little to the right. The patient had phthisis, but apparently the conditions were not such as to produce any changes in the position of the heart. (1) Otto's other case⁴ concerned a child with a right-sided position of the heart. The vessels were as usual as regards their position. There was a defect in the septum ventriculorum. (2) Breschet¹⁸ reports the case of a boy who died at $\frac{1}{12}$ th. The stomach and liver were normal in position. The right-sided heart showed defect in the septum of the auricles, absence of the septum of the ventricle, and the aorta came from the common ventricle. (3) Robinson (A. R.)²² reports a case of *transpositio cordis* with *cor biloculare*. (4) Kundrat²⁷ mentions the post-mortem report

on a boy of $\frac{5}{12}$ ths with a right-sided position of the heart, and with transposition of the large vessels. The aorta came from the anterior right cavity, and the pulmonary from the posterior left. The pulmonary artery was narrowed. The ductus botalli was open. (5) Lochte⁵⁰ describes in detail the pathological condition found in a man who died at the age of 46 from arteriosclerosis and chronic myocarditis. The right-sided heart showed a transposition of the ventricles, and there was also a corrected transposition of the large vessels, so that in spite of the transposition of the cavities the large vessels came from the cavities to which they belonged. (6) Baumgarth⁷⁹ notes a case of cor biloculare in which there was also a dextrocardia. (7) Lucchi^{78a} found post-mortem in a man of 63 a pure dextrocardia with no other transposition of organs.

A detailed consideration of these cases will come more naturally along with the next group, where there was, in addition to the pathological report, the recognition of the condition during life.

(b) Cases with both clinical and pathological report. This group is not by any means large, and of course the reported cases come at a later date, when the discovery of the methods of physical examination allowed and led to a more careful and also more accurate estimate of the contents of the chest.

Löwenthal,⁷⁹ who in 1900 separated out this definite group, considered the case he reported as only the fifth published one, but as one of his cited cases is that of Krönig,⁶⁶ where the dextrocardia was associated with abnormal breadth of the left lung, it seems more to belong to the previous division of extrinsic dextrocardia. Since Löwenthal's paper there have been very few cases that fall under this heading. Cipriani³⁶ reports the case of a man whose dextrocardia was recognised during life, but whose heart, with defects of both septa, was adherent to the pericardium and to the right lung. The condition was not recognised at birth, and though there is a report of an illness in early life, it still remains a moot question whether the dextrocardia was acquired, or whether a person with congenital dextrocardia had added to it a later pericarditis and pleurisy. A somewhat similar line of argument is applied by another observer, Paltauf,⁷⁶ who found a pericarditis at the post-mortem of a case which had been described years before by Bamberger³⁰ as a congenital dextrocardia. The only other later observation on record is an interesting case of Pal's,⁸⁷ which gave in 1907 a pathological

confirmation of a case shown and demonstrated in 1888 by Gruss²⁹ at the same time as the case of Bamberger's. The case of Wendling,⁷⁹ which occurred in a patient with phthisis though it was recognised clinically as showing the mirror type of dextrocardia, was found post-mortem to have the heart in the right thorax, but the apex directed to the left. My own personal contribution seems a case fitting in with the requirements of this section.

The list of such cases is the following:—

1. Pope.²⁴ A man of 41, who died of pneumonia, had during life his apex beat 2 ins. below the right nipple and 2 ins. to the right of the sternum. There was a mitral regurgitant murmur. There was no history of pleurisy, empyema, or pericarditis. At the post-mortem the heart was found nearly entirely to the right of the middle line. There was mitral endocarditis. There was no pleural fluid and there were no pleuritic adhesions. The vessels were normal.

2. Grunmach.³⁵ This case concerns a boy of 15 who had been dyspnoic and cyanosed since his second year. The post-mortem showed dextrocardia without transposition of the vessels. The foramen ovale persisted. There was pulmonary stenosis. There was a foramen in the septum ventriculorum.

3. Graanboom³⁷ reported a dextrocardia with the apex beat in the right anterior axillary line at the 6th rib. The detailed post-mortem by Reddinguis³² showed a complete transposition of the vessels,

4. Löwenthal.⁷⁹ The apex beat was in the 5th right space. The post-mortem showed an absence of the pulmonary artery with the ductus botalli as arterial vessel. There was a gap in the upper part of the septum of the ventricles.

5. Pal.⁵⁷ This patient was reported as a dextrocardia by Gruss²⁹ in 1888, and had again come under observation about the time of her death in 1907. The heart was noticed to be beating on the right side when the child was 3 days old. The apex beat was under the edge of the 4th rib, a little outside of the nipple. There was a systolic murmur. The post-mortem confirmed the dextrocardia. There was also aortic stenosis. The large vessel was unchanged.

6. This is the personal observation detailed above, with a dextrocardia observed from birth and a post-mortem showing a cor trilobulare biventriculare and no change in the large vessels.

GROUP III. *Clinical Cases only*.—The largest and last group is made up of those with only a clinical report, and as it is important

to see the kind of case which is put forward as dextrocardia, an attempt will be made to put very briefly the main and apparently salient points of each individual one in tabular form:—

Author.	Sex.	Age.	Heart.	Lungs.	Other Remarks.
Mosler ¹⁵	M.	29	Mirror type.	Normal.	
Schrötter ¹⁷	M.	32	Apex beat 5th right axillary space.	Right lung impaired above. Absolutely dulness below.	Congenital dextrocardia plus added traction.
Mosler ¹⁸	F.	36	Mirror type.	Normal.	
Leichtenstern ^{19A}	M.	21	Patent foramen ovale. Pulmonary stenosis.		Heart disease from birth.
Henoch ^{19B}	F.	11	Pulsation 3rd right space.		Right index only two phalanges. Absent right thenar.
Bramwell ²⁰	M.	39	Pulsation 1 in. outside right nipple line.		
Wehn ²³	M.	27	Apex beat 5th space inside nipple line.		
Wehn ²³	M.	21	Pulmonary stenosis. Patent septum ventriculorum.		Cyanosis from childhood.
Schrotter ²⁶	M.	22	Apex beat under sternum. Heart also to right of sternum.	Left pleural exudate.	
Süssmann ²⁸		15	Free movements of heart and lung.		Pleurisy, early childhood.
Grünfeld ³³	F.	44	Apex beat 5th 2 cm. inside nipple line.		Noticed at 14.
Niesel ³⁴	M.	20		Right-sided pleurisy.	Author uncertain.
Becker ³⁵	M.	25	Mirror type, 4th.		No previous illness.
Schott ³⁹	M.	45	Mirror type.		A twin. No evidence of pleurisy.
Hawkins ⁴⁰	M.	12	Apex beat between 5th & 6th, 1 in. outside nipple line.		Pulmonary stenosis and regurgitation.

Author.	Sex.	Age.	Heart.	Lungs.	Other Remarks.
Ewart and Bennett ⁴¹				Bronchiectasis.	
Bard ⁴²	F.	15	Copy of oppo- site side.		Mitral stenosis.
Heimann ⁴³	M.	21			Left half body and left eye smaller. Left temple hol- low. Chest also mis- shapen.
Carmichael ⁴⁵	M.	7	Systolic occa- sionally.		Bronchitis and emphysema previously.
Gerrard ⁵⁴	F.	26	Apex beat 4½ in. to right.	Never had pleurisy.	Mitral stenosis and regurgi- tation.
McLennan ⁵⁵	M.	15		Weak breath- ing over right lung.	
Berks ⁵⁶	M.	3½	Pulsation 3rd, 4th and 5th		Cyanosis.
Bramwell ⁵⁷		5			Pulmonary sten- osis.
Wehsemeyer, Sobierajczyk ⁵⁹	M.	16	Apex beat 4th right inside nipple line.	Lung changes on left side.	X-ray.
Wardrop- Griffith ⁶¹	F.	7	Apex beat 3rd right.		Pulmonary sten- osis plus septal defects.
Petit et Ravaut ⁶⁴			Heart normal.		Recognised at 13.
Middleton ⁶⁵			Heart normal.		Absence left radius and thumb. Cur- vature of thorax. Left chest small.
Leop ⁶⁸	M.	8	Heart normal.	No lung dis- ease.	
Chapman ⁶⁹	M.	40	Apex beat 4th nipple line.		No history of pleural peri- cardial or lung disease.
Crispino ⁷²		55		No chest affec- tion.	Recognised since 15th year.
Bonheim ⁷³	M.	7	Pulmonary sten- osis plus other defects.		
Schmilinsky ⁷⁴	F.	9	Ductus botalli persistent.		A twin. Noted from birth.
Monks ⁷⁵	M.	28	Heart normal.		No previous ill- ness.
Gossage ^{75A}	F.	46			Previous illness.

Author.	Sex.	Age.	Heart.	Lungs.	Other Remarks.
Wagner ⁷⁸	M.	23			Asymmetry of face on right side.
Weinberger ⁷⁷	M.	19	Aortic stenosis.		
Flatau ⁸⁰	F.	37	Mirror type.		No previous illness.
Neumann ⁸⁴	M.	20	Apex beat 5th.	Phthisis right apex.	
Hawthorne ⁸⁶	M.	11	Systolic at apex beat.		
Tate ⁸⁸				Phthisis.	
Aufdermauer ⁸⁹	M.	50		Right hydrothorax.	Dyspnoea from childhood. Past and present chest disease.
..	F.	48			Recent active disease base right lung.
..	M.	57	Apex beat 5th.		No serious illness previously.
..	M.	30	Apex beat outside right nipple line.		No previous illness. Accident of recent date in region of stomach.
..	F.	76	Mitral stenosis.		Inflammation of lungs 10 years previously.
Carpenter ⁹⁰		Age and sex not stated.		Few moist sounds base of right lung.	

These 46 cases, then, represent all those which, on clinical grounds only, have been published as examples of congenital dextrocardia, except one or two that I have been unable to get access to.

These three groups of congenital dextrocardia are naturally of different value, and cannot lead to the same kind of certainty in diagnosis. The first two, where the pathological lesion is known, must form the basis of any consideration regarding either the diagnosis of the condition or the discussion as to its origin.

In all of them the age is very varied, and is really of no importance, as it obviously depends on the associated lesions of heart, lungs, or other organs, and not on the displacement as such. It also seems idle to analyse the incidence of sex here. The cases founded only on clinical observation provoke criticism in many

ways, but instead of dealing with them individually it seems better to make use of the knowledge gained from the consideration of all the possible causes of congenital dextrocardia as well as from the records of pathologically confirmed instances in arriving at a means of correct diagnosis. Incidentally this will allow of a general criticism of the claims put forward for these clinical cases.

The diagnosis of congenital dextrocardia depends on (1) the recognition of the dextrocardia and (2) the proof of its being congenital. Dextrocardia is recognised by the absence by all the usual clinical methods of a heart on the left side and its presence on the right side. This, needless to say, implies in straightforward cases that an apex beat, or presumably such, is beating on the right side, and can be confirmed by palpation, that percussion supports the underlying presence of a heart, and that auscultation gives heart sounds of such strength and tone as such a change in position would lead one to expect. All this is generally described in typical mirror cases, but of course it may be modified if the heart is merely a little to the right of the middle line. Many of the cases described above respond quite readily to these methods of examination, which have, of course, been applied to their solution. At the same time these methods have their limitation, as cases which were presumed to be dextrocardia have pathologically been found to be merely enlargements of the heart to the right. Further, these methods, without a complete anamnesis, cannot exclude a lateral displacement of considerable degree. Bard⁴² has tried to show that ordinary lateral displacement gives a pulsation at a higher level than would a mirror type of heart, and that the base is the most movable part of the heart. Schrötter and others after him have laid stress on the accentuation of the 2nd sound at the base on the right side in true dextrocardia, but unless as a supplementary sign it seems unworthy of so much value being ascribed to it.

The other means of determining the presence of a dextrocardia is by the newer X-ray method. It was first used in this connection by Weismeyer,³⁹ and at later dates by Senator,⁴³ Petit et Ravaut, Leo, Crispino, Bonheim, Weinberger, Neumann, Pal, Tate, Grunmach, Aufdermauer, and the personal observation herewith. While it confirms the dextrocardia, its most hopeful use is in determining the axis of the heart. In real congenital dextrocardia the axis should run from above and left downwards and to the right, and not as in mere lateral displacement with so often merely an axis parallel with its original, or only slightly less sloped to

the right. Some also think they can determine the course of the vessels.

As a necessary sequel to the recognition of the dextrocardia there is the need to exclude any general inversion of the other organs. A lack of this, as has already been mentioned, invalidates many of the older cases. In the case of Carmichael, reported above, there was some question as to the position of the liver and the spleen, and this, apart from other things, makes its inclusion here doubtful.

The second point is to determine the congenital nature of the displacement. As will be noted, the right-sided position of the heart from birth was only noted in a very few instances. Where it was so observed, the next point obviously is to settle whether it is of intrinsic or extrinsic origin. This in itself is no easy matter, and many cases reported as true dextrocardia have at a later date been shown to be due to the extrinsic causes detailed previously. If there be no note as to the condition from birth, then a proof of its congenital nature has to rest on a personal history free from such chest conditions as might cause displacement, along with a physical examination that supports this contention. The especial points requiring establishment are the free movements of the heart and the lungs, equal respiratory murmur on the two sides, and absence of any change in the shape or size of the chest that might be suggestive of past disease. An X-ray examination is also useful here in showing a healthy lung condition and in defining the level and the movements of the diaphragm, and thus helping to exclude past pleurisy or pulmonary retraction. This method of arriving at a diagnosis is the one that justifies the name "congenital dextrocardia" being applied to cases such as the two cited by Mosler, the first case of Bramwell's, those of Becker Chapman, and others mentioned above. It is, however, when congenital dextrocardia is diagnosed in cases with the simultaneous presence of pleural or pulmonary disease, as is so often done in the above list, that one is entitled to accept it only with a very becoming suspicion. Without a history of the presence of the heart displacement being anterior to the chest condition, post-mortem records have in most cases shown that the diagnosis of its congenital nature is wrong. Acquired dextrocardia is moderately common, and it occurs just subsequent to pleural or pulmonary affections such as are detailed above, while congenital dextrocardia is one of the rarities of medicine, and can only be diagnosed where every possible cause of the acquired forms can be excluded. As a

case in point is that described by Berwald⁴⁴ as a congenital dextrocardia. It concerned a man of 17 with no illness of any consequence previously. The apex beat was at the right side, just inside the right nipple line. The patient died from phthisis, but there was no adhesion between the pericardium and the right lung. The apex beat was directed to the left. There was some adhesion between the sternum and the pericardium. The case must thus be considered an acquired one.

Two interesting facts emerge for consideration before the question of the etiology is approached. The first is the great frequency both in the post-mortem cases and even in the clinical cases with which defect or disease of heart is present. There is indeed nothing so striking in the whole series of cases as the close relation which exists between the displacement and disease or defect of the heart. The nature of the cardiac lesions varied considerably, but far the greater number were septal defects in either cavity or in both. In some cases there was absence of vessels. In short, arrest of development rather than disease is the prevailing thing. Hochsinger (Pfaundler and Schlossmann, *The Diseases of Children*, vol. iii. p. 486) bears this out when he says, "The congenital changes in the position of the heart, whether accompanied by situs inversus or not, are almost always associated with intra-cardial arrest of development." Indeed, if one were to argue from the cases of congenital dextrocardia with pathological control, one would be inclined to lay some stress on the presence of signs of congenital heart disease as, other things being favourable, an argument for the congenital nature of the dextrocardia.

The other thing of interest is the presence of defects elsewhere, as in the case of Henoeh, with a right index with only two digits and an absent thenar eminence, or the asymmetry noted in the cases of Heimann and Wagner, or lastly, the various defects noted in Middleton's case.

The last point for consideration is the ultimate causation of these cases. Many have offered explanations and have usually applied to these cases of partial inversion the same theories that are brought forward as solutions of general inversion. It is, however, very doubtful if they have any bearing in this relation, for strange though it may seem to say it, there has not yet been described any single case of congenital dextrocardia which will fit into the definition put forth in the beginning. None of these congenital dextrocardias are true inversions, and as has been seen, almost all are complicated with heart defects. Even where the

cavities have been reversed the vessels are corrected, so that Schrötter²⁶ and Paltauf⁷⁶ are justified in their view as to the absence as yet of any true case of inversion of heart and blood-vessels. A. K. Stone⁸¹ in a short review of the subject also comes to the conclusion that almost all the known cases of dextrocardia have been accompanied by extensive malformation of the heart, and that no true case is on record.

The explanation of these cases, such as they are, has been attempted along different lines. In the slight cases of displacement it has been assumed that the presence of heart defect has led to an enlargement of the heart at an early date in foetal life when the heart is still mesial in position. Lochte⁵⁹ considers these heart anomalies never occur without some abnormal arrangement of the vessels or organs of the abdomen. The inverted position of an organ such as the heart is due to some local developmental anomaly, and the presence of so many pathological faults in these inverted hearts goes to support this. It also indicates its occurrence at an early stage of development, *i.e.* before the second month when the septa close. The present case, with its three generations with heart disease, would thus seem in its displacement and defect to indicate a weakening in the germinal area concerned in the development of the heart.

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ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

THE following gentlemen, having passed the requisite examinations were at a Meeting of the College, held on the 19th October, admitted Fellows :—

J. E. Adam, Whinneyhill, near Rotherham ; J. C. R. Braine-Hartnell, Cheltenham ; J. C. Bridge, Dunfermline ; M. B. S. Button, Deal, Kent ; B. P. Campbell, Edinburgh ; D. Cotterill, Edinburgh ; O. C. Dorman, Winnipeg, Manitoba ; E. C. Dutton, Manchester ; W. Fleming, Shantung, North China ; J. S. Goodall, London, W. ; W. L. Gordon, Edinburgh ; R. Hill, Whiteabbey, Co. Antrim ; E. L. R. Hodgins, Lucan, Ontario ; I. W. Johnson, Bury, Lancashire ; J. W. McIntosh, London, S.E. ; C. MacLaurin, Sydney, N.S.W. ; S. Murray, Belfast ; M. M. Mamourian, Ashton-under-Lyne ; H. J. More, Edinburgh ; C. C. Murison, Captain, Indian Medical Service ; J. O'Doherty, Belfast ; S. P. Shroff, Edinburgh ; A. Simpson, Tranent, East Lothian ; V. F. Usher, Nelson, New Zealand ; P. L. Watkin-Williams, Bridgwater, Somerset ; R. Wilkins, Longton, near Preston ; H. J. Williams Plumstead, Cape Colony.

THE FREQUENCY OF SPHENOIDAL SINUS
SUPPURATION.

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STATISTICS as to the frequency of chronic suppurative catarrh of the nasal accessory sinuses vary very greatly, even when they are derived from post-mortem examinations.

Minder found accessory sinus suppuration in 14 out of 50 post-mortem examinations (28 per cent.); Lapalle in 55 out of 169 (32 per cent.); E. Fränkel in 63 out of 146 (40 per cent.); Gradenigo in 26 out of 100 (26 per cent.); Kirkland in 35 out of 100 (35 per cent.). We may take it then that, according to these observers, accessory sinus suppuration is present in about 33 per cent. of autopsies.

Harke gives the results of some 394 consecutive post-mortem examinations in which he examined carefully, though only with the naked eye, the condition of the upper air-passages and all their accessory cavities. Out of these he details the records of 164 cases that showed some feature of interest connected with these passages. No less than 131 cases had suppuration (or at all events catarrh) of the mucous membrane of accessory cavities, as evidenced by swelling, redness, the presence of pus or great quantities of mucus, and in some cases hæmorrhages into the substance of the membrane; that is to say, about 33 per cent. of all cases brought to post-mortem examination.

One must, in the first place, allow for some of the cases in which fluid was found in the sinuses as being due to stomach contents vomited up before death or expressed in the handling of the body post-mortem, and Harke, in some of the cases, states that the fluid was apparently of this nature. Further, one must note that a large proportion of the cases with which Harke dealt had infective processes of the upper or lower air passages, and in these an inflammatory or catarrhal condition of the nasal passages is in no wise extraordinary. If one deducts these (*viz.* phthisis,

38 cases: pneumonia, 42 cases: and inflammatory conditions affecting the head or throat, 24 cases) one is left with 27 cases or 6·8 per cent. of all those brought to post-mortem examination. These figures, 6·8 per cent., probably represent more nearly the average of sinus suppuration present in the general mass of the population.

Out of the 131 cases mentioned the sphenoidal sinus was affected in 45, and in 6 of these without involvement of any other sinuses. The other sinuses were affected in 120 cases, and without participation of the sphenoidal sinuses in 84 of these.

With regard to the type of inflammation present, this seemed to be of an acute nature, except in some half-dozen cases where hypertrophy was noted, and in about 13 of the 45 sphenoidal sinus cases it was severe and accompanied by hemorrhages indicating inflammation as distinct from mere catarrh.

The percentage of accessory sinus suppuration usually given (33 per cent.) is, however, much greater than that obtained by clinical experience, even at an oto-laryngological clinique where one might expect suppurative catarrh in the nasal accessory sinuses to be more frequent than in the wards of a general hospital. Chiari and Lichtwitz found sinus suppuration in only 2 per cent. of cases at their clinics, and statistics obtained from the report of Logan Turner's section of the Ear and Throat Department of the Edinburgh Royal Infirmary for the year 1907 confirm this (64 cases of sinus suppuration out of 3172 patients = 2 per cent.).

Several explanations have been put forward in regard to this discrepancy: (1) Acute sinusitis is often overlooked; (2) chronic sinusitis may give rise to no symptoms except those of nasal catarrh; (3) post-mortem statistics are of course compiled from fatal cases, in many of which severe infections were present; (4) pus or muco-pus may have accumulated in the sinus shortly before death on account of the failure of ciliary action; (5) mucus from the nose, mouth, the bronchi and lungs, in addition to stomach contents, may enter the sinuses after death.

There is a certain amount of truth in all these theories, and yet they fail to explain the difference between the 33 per cent. of accessory sinus suppuration as ascertained by naked-eye post-mortem examination and the 2 per cent. as revealed by clinical experience.

The fallacy lies in the fact that in the large majority of cases the post-mortem statistics have been compiled merely by opening the

accessory sinuses and naked-eye inspection of the contents: if muco-pus was found in the sinus, the case was put down as one of accessory sinus suppuration. We agree with Lack in considering that definite histological changes in the walls of the sinus are the only true criterion of sinus suppuration. Watson Williams recognises two forms of sinusitis: (1) catarrhal and (2) purulent. This is only reasonable when we remember that these sinuses are lined by a mucous membrane continuous with that of the nasal cavities, and that catarrhal rhinitis is a very frequent complaint, whereas suppurative rhinitis and ozæna are comparatively rare. The same classification applies to disease of the middle ear cleft, and if we were merely to trust to naked-eye inspection of this cleft at post-mortem examination, especially in children, we should come to the conclusion that suppurative otitis media was an exceedingly common condition.

The object of this paper is to show that, while slight catarrhal changes in the mucous membrane of the sphenoidal sinus may often be found at post-mortem examination in a general hospital, microscopic examination of the tissue proves that genuine suppuration is rare.

In the case of patients who die of acute inflammatory diseases such as pneumonia, influenza, scarlatina, measles, diphtheria, cerebro-spinal meningitis, &c., the proportion with evidence of acute inflammatory changes in the mucosa of the nasal accessory sinuses is very large, but we have no evidence to offer on this point.

Kelly found pus in the antrum in 19 subjects out of 100 examined, but acknowledges that this does not mean sinus suppuration. In 5 of the above 19 cases the mucous membrane was normal, in 11 thickened, in 1 polypoid, and in 2 it was cystic. It should be stated that 5 of the above 19 patients died of pneumonia. Kelly gives a table showing that accessory sinus suppuration is present in over 50 per cent. of patients who die of pneumonia.

Goetjes examined the sphenoidal mucous membrane microscopically in 31 cases irrespective of the causes of death; he examined 100 bodies without making microscopic sections of the mucosa. In no case did he find great thickening of the mucous membrane.

In three cases he found dirty brown fluid in the sinus which probably came from the stomach. In 6 cases he found muco-pus, and in 4 cases pus in the sinuses; but on microscopical examina-

tion no inflammatory condition of the lining membrane was found. In one case he found exudation in the sinus, and the mucosa showed œdema, hæmorrhages, and infiltration with round cells. Goetjes several times found slight round cell infiltration in an otherwise sound mucous membrane.

Four of Goetjes' 31 cases showed acute inflammatory changes, and in 3 of these hæmorrhages were present. In 8 of the 31 cases recent hæmorrhages were present, and in 9 others there was pigment—the remains of old hæmorrhages. In marked contrast to our findings Goetjes noted few sections which showed glands in the mucosa, but on the other hand he states that he found many cysts.

With regard to the relative frequency of suppurative processes in the various sinuses, the order usually given (as obtained from post-mortem statistics) is as follows:—(1) Maxillary antrum; (2) ethmoidal cells; (3) sphenoidal sinus; and (4) frontal sinus. Some observers have placed the sphenoidal sinus next to the maxillary antrum.

On counting up Harke's cases we find that the frequency with which the different sinuses are affected is:—Maxillary antrum, 28 per cent. of all cases; sphenoidal sinus, 11 per cent; frontal sinus, 3·7 per cent.; ethmoidal cells, 3·2 per cent.; and middle ear, 21 per cent.

Oppikofer has recently published an account of the microscopic examination of the mucous membrane from 165 cases of chronic sinusitis operated on in Basel, and the proportions are as follows:—Antrum, 118; frontal sinus, 32; ethmoidal cells, 12; sphenoidal sinus, 3.

There is here again a marked discrepancy between the results obtained at autopsy and those gained from clinical experience, and it has been suggested that the position of the body just before and after death favours the entry of mucus and other fluids (*v.g.* stomach contents) into the sphenoidal sinus.

The importance of this question—the frequency of sphenoidal sinus suppuration—will appear from the following brief account of the anatomical relations of this cavity:—The sphenoidal sinus is a six-sided chamber. The superior wall is related to the optic chiasma and optic nerves, to the sella turcica and hypophysis cerebri, to the frontal and temporo-sphenoidal lobes of the brain; the lateral wall is related to the carotid canal and to the cavernous sinus with the third, fourth and sixth nerves; the lower wall forms part of the roof of the nose and of the nasopharynx; the

anterior wall lies in the frontal plane, and is the thinnest of all—it has a nasal part which contains the ostium of the sinus, an ethmoidal part related to the most posterior ethmoidal cell, and frequently an antral part related to the maxillary antrum. The inner wall is the septum, which separates one sinus from that on the other side; and the posterior wall, which is usually thick, is composed of the basisphenoid. According to Onodi, the posterior wall may come into close relation with the pons varolii.

Watson Williams says that chronic suppurative catarrh of the sphenoidal sinus is by no means a rare affection, and that it is one of the commoner causes of post-nasal catarrh. It has been said that sphenoidal sinus suppuration is common, but its diagnosis is rare.

The relationship of diseases of the eye, and especially of the optic nerve, to suppurative conditions in the nose and its accessory sinuses has of late attracted a good deal of attention, and has formed the subject of a monograph by Professor Onodi, of Budapesth. Mendel and Lapersonne have stated that half the cases of unilateral optic neuritis are of nasal origin, but Onodi considers this statement exaggerated. We may say here that we can confirm Onodi's statement as to the close relationship of the sphenoidal sinus to the optic nerves.

St. Clair Thomson has collected 40 cases of intracranial complication following sphenoidal sinus suppuration, and has added two of his own. In 17 of these 42 cases meningitis was the only or predominant lesion: in 4 cases thrombosis of the cavernous sinus was the primary complication; 13 cases showed a combination of thrombosis and meningitis: there were also 2 cases of meningeal septicæmia, 1 case of intracranial abscess, 1 of encysted abscess of the dura mater, 1 of hæmorrhagic encephalitis and general septicæmia, 1 of phlebitis of the cavernous sinus and pyæmia, 1 of intracranial hæmorrhage, and 1 of suppurative encephalitis. According to St. Clair Thomson infection may pass from the sphenoidal sinus to the cranial cavity by (1) perforation of the bony walls of the sinus: (2) through the diploe: (3) by way of the veins; and (4) by the lymphatics.

Present Investigation.—The specimens were obtained in the post-mortem room at the Royal Infirmary from cases in which the calvarium had been removed for the examination of the brain and, as the table shows, were representative of the cases that come to autopsy at a general hospital. After the removal of the brain, an antero-posterior saw-cut was made on each side of the sella

turcica forwards to the level of the middle of the cribriform plate. These two cuts were joined anteriorly by a third made in a transverse direction and passing down into the nasal cavities. One blow with a broad chisel posteriorly went through the basi-occipital, and in this way a cuboidal block was removed containing the sphenoidal sinus and the most posterior ethmoidal cell on each side; the posterior ends of the middle and superior turbinates were removed and the sphenoidal sinus opened through its anterior wall; the contents of the sinus were noted, and the block was placed in 10 per cent. formalin. After fixation the mucous membrane was peeled out with a fine blunt dissector, and, as a rule, came away almost entire. The mucous membrane of the sinus was then cut into strips and carried through in the ordinary way to paraffin. The mucous membrane from the right sphenoidal sinus was throughout kept separate from that of the left sinus. The microscopic sections were stained with hæmatoxylin and eosin. While peeling out the mucous membrane we noted that the covering of the anterior wall is thicker than that of the other walls of the cavity, and that the veins from the mucosa of the sinus pass into the external bony wall towards its posterior part. In three cases the bony canal enclosing the internal carotid artery formed on both sides a bulging in the outer wall of the sinus towards its posterior parts. We did not meet with any extension of the sphenoidal sinus into the posterior part of the nasal septum.

We may here call attention to the fact that we had previously had the opportunity of examining the mucous membrane obtained from 19 cases of acute or chronic suppuration in the nasal accessory sinuses, so that we were in a position to recognise the changes in the mucosa characteristic of these conditions.

SUMMARY OF RESULTS OF INVESTIGATION.

Naked-Eye Examination.—Stomach contents were found in both sinuses in one case (16). Mucus was found in one sinus in two cases (1 and 2), and in both sinuses in four cases (14, 26, 35 and 44). Mucopus was found in one sinus in three cases (19, 34 and 40), and in both sinuses in six cases (3, 10, 18, 29, 41 and 47). A cyst was found in the left sinus in case 40. Therefore the contents of the sinuses were abnormal in 27 out of 100 examined; or, if we consider cases, in 16 out of 50, *i.e.* 32 per cent. It is worthy of note here that 33 per cent. is the average of acces-

sory sinus suppuration as reported by other writers from naked-eye examination.

Microscopic Examination.—In the present series of 50 cases we found only one which showed in both sinuses the presence of acute inflammatory changes (Case 29, in which the patient died of acute lobar pneumonia), one case in which the mucosa of the left sinus showed evidence of acute inflammatory change (Case 16), and one case with marked chronic inflammatory changes (Case 19). It will be seen, therefore, that in only three out of 50 cases were we able to make sure of the presence of a marked degree of inflammatory change, and two of these were acute cases in which the mucosa might have returned to normal had the patient survived.

The contrast is very striking between 32 per cent., in which the contents of the sinus were abnormal on naked-eye inspection, and 6 per cent., in which microscopic examination revealed the presence of marked inflammatory changes.

On the other hand we found the presence on one or both sides of slight catarrhal changes in the mucosa in 17 cases (34 per cent.); in these specimens we noted the presence of excess of mucus on the surface, increase in goblet cells, slight oedema, or small cell infiltration of the submucous tissue.

The presence of mucous glands in the submucous tissue was noted in 20 of the 100 sinuses examined.

In 12 of the 100 sinuses we noted the presence of erectile tissue in the submucous layer (see Fig. 4, Case 50) of the mucous membrane. It is of course well known that this tissue exists in the submucous layer of the nasal mucosa, especially in the inferior turbinal body, but we have not met with any reference to its presence in the lining membrane of the nasal accessory sinuses.

We wish to acknowledge a grant from the Carnegie Trust in regard to the reproduction of microscopic sections.

Conclusions.—(1) Naked-eye examination of the contents of a sinus is not a reliable guide to the presence of accessory sinus suppuration; histological examination is the only true guide. (2) Chronic suppuration is not common in the sphenoidal sinus as found at the post-mortem room of a general hospital. (3) Slight degrees of catarrh of the mucous membrane of the sphenoidal sinus are fairly common. (4) Mucous glands and erectile tissue are frequently present in the submucous layer of the sphenoidal mucous membrane.

PLATE I.

1



FIG. 1.—Normal mucous membrane from maxillary antrum. \times about 50 diam. 1. Ciliated mucous membrane. 2. Submucous connective tissue. The mucous membrane of the sphenoidal sinus is similar.

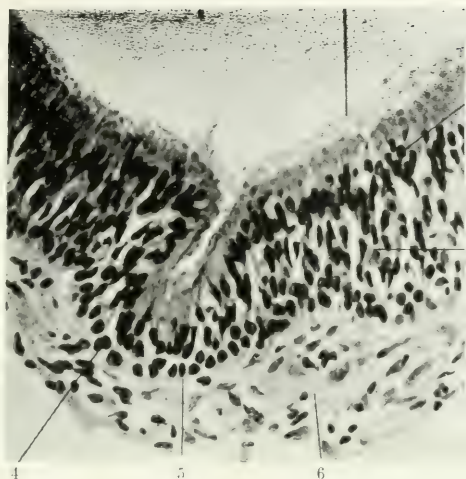


FIG. 2.—Normal mucous membrane from maxillary antrum. \times about 400 diam. 1. Normal mucous secretion. 2. Superficial layer of columnar ciliated cells. 3. Intermediate layer of spindle-formed cells. 4. Deep layer of cubical cells. 5. Basement membrane. 6. Connective tissue. The mucous membrane of the sphenoidal sinus is similar.



FIG. 3.—Normal ostium of sphenoidal sinus. \times about 17 diam. 1. Epithelial lining of sinus. 2. Mucous glands in connective tissue.



FIG. 4 (Case 50).—Mucous membrane from sphenoidal sinus; shows thin-walled blood spaces in submucosa (erectile tissue). \times about 80 diam.

PLATE II.

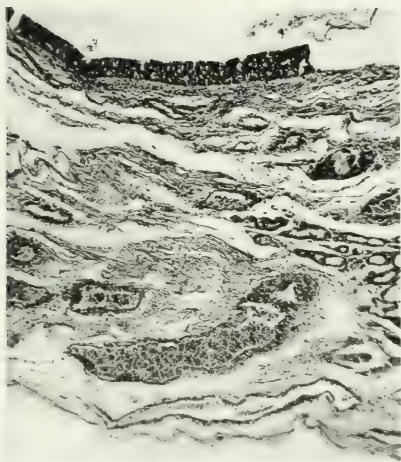


FIG. 5 (Case 19).—Mucous membrane from sphenoidal sinus; shows glands in submucosa and large thin-walled blood spaces (erectile tissue). \times about 80 diam.

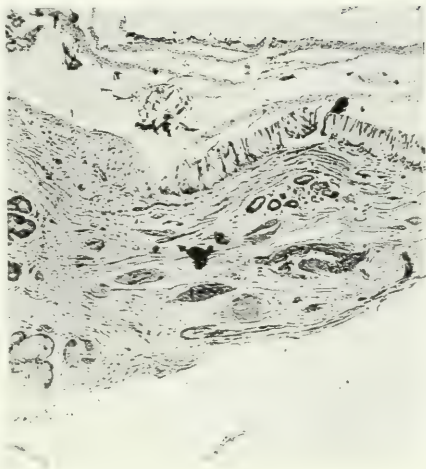


FIG. 6 (Case 26).—Catarrh of mucous membrane. Mucous membrane from sphenoidal sinus showing mucus on surface; excess of goblet cells; glands in submucosa. \times about 80 diam.

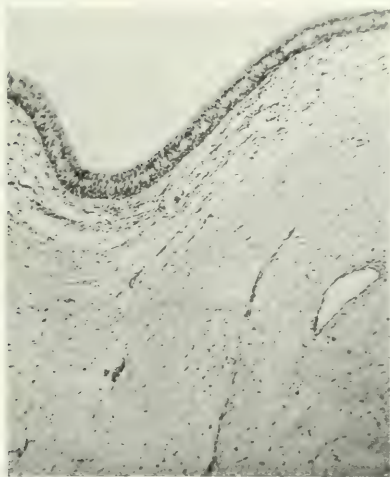


FIG. 7 (Case 34).—Mucous membrane from sphenoidal sinus; shows small-celled infiltration and edema of submucosa. \times about 80 diam.

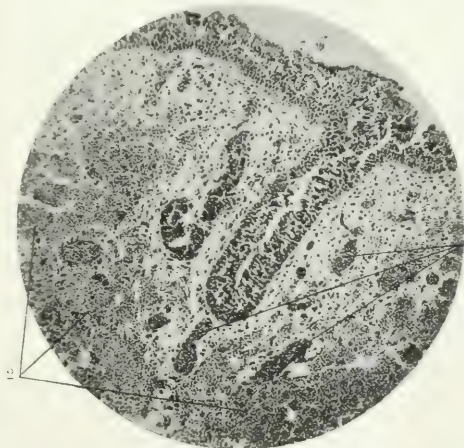


FIG. 8 (Case 29).—Mucous membrane from sphenoidal sinus showing acute inflammatory changes. \times 50 diam. 1. Engorged blood-vessels. 2. Hemorrhages. Notice disintegrated condition of surface epithelium.



PLATE III.



FIG. 9.—Mucous membrane of maxillary antrum from case of chronic suppurative catarrh. $\times 60$ diam. 1. Catarrhal secretion on surface. 2. Superficial epithelium. 3. Hæmorrhages in submucous tissue.

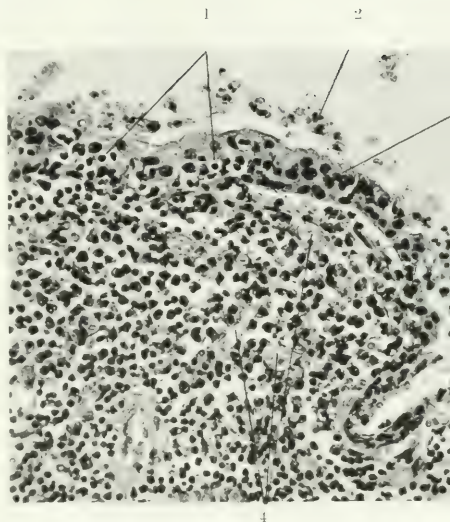


FIG. 10.—Mucous membrane of antrum from case of chronic suppuration. \times about 300 diam. 1. Leucocytes passing through epithelial layer to the surface. 2. Purulent secretion. 3. Epithelium showing loss of ciliated layer. 4. Engorged blood-vessels.

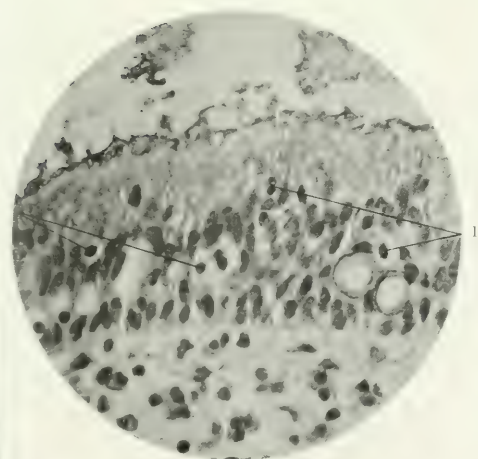


FIG. 11.—Superficial epithelium from case of chronic maxillary antral suppuration. $\times 600$ diam. 1. Leucocytes making their way to the surface through the epithelial layer. Notice the catarrhal exudation on surface.

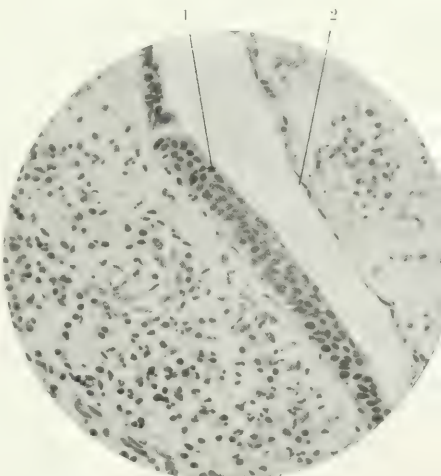


FIG. 12.—Mucous membrane from maxillary antrum from a case of chronic suppurative catarrh. $\times 300$ diam. 1. Metaplasia of superficial epithelium—approach squamous type. 2. Complete loss of epithelium—basement membrane, however, remains.

This plate is introduced to show the nature of the changes in the mucous membrane in chronic suppuration in the accessory sinuses.

RESULTS OF MICROSCOPIC EXAMINATION.

Case.	Age.	Cause of Death.	Right Sphenoidal Sinus.	Left Sphenoidal Sinus.
1. J. K., m.	71	Gangrene of leg.	Normal.	Normal; goblet cells +.
2. J. T., f.	40	Aortic and mitral disease.	Normal.	Normal; goblet cells +.
3. J. C., f.	45	Pneumonia.	Normal.	Great œdema of submucosa; cells of mucous membrane mostly goblet cells; superficial layer lost in places; very little small-cell infiltration.
4. W. L., m.	68	Cirrhotic kidney. Œdema of brain.	Great loss of superficial cells; small-cell infiltration of submucosa and mucous membrane; vessels distended; basement membrane thick and eroded.	Characters similar; great œdema.
5. J. M., m.	33	Miliary tuberculosis.	Normal.	Normal.
6. C. B., m.	31	Tuberculous meningitis.	Normal.	Normal; mucous glands in submucosa numerous.
7. M. H., f.	73	Cerebral hæmorrhage.	Normal.	Normal.
8. J. M., m.	15	Accident.	Normal.	Normal; numerous mucous glands.
9. J. S., m.	70	Atheroma of cerebral vessels.	Normal.	Normal; numerous mucous glands.
10. T. R., m.	52	Cerebral hæmorrhage.	Normal.	Normal.
11. E. C., f.	65	Cancer of stomach.	Normal.	Normal; goblet cells +.
12. R. N., m.	60	Ulcerative endocarditis.	Normal; mucous glands numerous.	Normal; mucous glands numerous.
13. A. R., f.	13	Acute tuberculous bronchopneumonia.	Normal; mucous glands numerous.	Normal; mucous glands numerous.
14. J. T., f.	42	Spleno-medullary leukaemia.	Normal; goblet cells +.	Œdema of submucosa; much small-celled infiltration around glands; goblet cells -.
15. J. F., m.	60	Cardiac failure.	Normal.	Normal; numerous mucous glands.
16. M. S., f.	9	Burns; endocarditis.	Slight small-celled infiltration; œdema; mucous glands numerous.	Œdema of submucosa; small-celled infiltration; congestion and hæmorrhages.
17. A. R., m.	37	Chronic Bright's disease; uræmia.	Normal.	Normal.
18. J. P., m.	70	Acute lobar pneumonia.	Slight œdema of submucosa; mucous membrane quite healthy.	Normal.

Case.	Age.	Cause of Death.	Right Sphenoidal Sinus.	Left Sphenoidal Sinus.
19. R. M., f.	49	Scirrhus of breast.	Œdema, congestion, infiltration with leucocytes; basement membrane thickened; mucous membrane ragged.	Œdema; congestion; infiltration of mucous membrane with thickened basement membrane.
20. W. F., m.	9	Accident.	Papillæ in mucous membrane; mucous glands numerous; normal.	General hæmorrhage in submucosa, due to fracture. Normal.
21. A. J., m.	23	Acute meningitis.	Normal.	Normal.
22. M. S., f.	39	General tuberculosis.	Normal.	Normal.
23. P. M., m.	74	Fracture of skull.	Normal.	Normal.
24. I. W., f.	35	Fracture of skull.	Normal.	Normal; much hæmorrhage into submucosa.
25. J. G., f.	48	Nephritis.	Normal.	Normal.
26. A. C., f.	50	Malignant disease of ovary.	Slight œdema of submucosa.	Slight œdema and congestion of submucosa; many goblet cells; catarrh.
27. J. S., m.	55	Cancer of liver.	Normal.	Normal.
28. R. L., m.	45	Bronchopneumonia.	Œdema of submucosa marked; mucous membrane healthy.	Œdema of submucosa marked; mucous membrane healthy.
29. M. S., f.	37	Lobar pneumonia.	Œdema of submucosa and dilatation of vessels marked; goblet cells +; mucous glands in submucosa.	Excessive œdema of submucosa, with many hæmorrhages; very great goblet cell formation.
30. F. M., m.	54	Bronchopneumonia.	Much œdema of submucosa; goblet cells +.	Some œdema of submucosa; goblet cells much +.
31. J. G., m.	40	Acute gastroenteritis.	Normal.	Normal; some hæmorrhage in submucosa.
32. J. K., m.	68	Heart failure.	Some small celled infiltration into submucosa; mucous glands present; goblet cells +.	Normal; goblet cells +.
33. J. S., m.	50	Diabetes, bronchopneumonia.	Normal; mucous glands present.	Normal.
34. M. H., f.	46	Heart failure.	Normal.	Superficial epithelium generally healthy, but desquamated in places; great œdema of submucosa and dense small cell infiltration.

Case.	Age.	Cause of Death.	Right Sphenoidal Sinus.	Left Sphenoidal Sinus.
35. W. T., m.	36	Acute encephalitis with œdema of brain.	Desquamation of superficial epithelium; great œdema of submucosa; dilatation of blood spaces; mucous glands present.	Similar to right.
36. A. L., m.	42	Meningitis.	Normal.	Normal.
37. J. D., m.	37	Cerebral hæmorrhage.	(Edema of submucosa.	(Edema of submucosa; goblet cells +; mucous glands present.
38. M. J., f.	34	Exophthalmic goitre; pericarditis.	Normal.	Normal; goblet cells +.
39. J. K., m.	44	Cerebral softening; pneumonia.	Normal.	Slight œdema of submucosa; goblet cells considerably +.
40. J. D., m.	37	Chronic Bright's disease.	Submucosa shows small-cell infiltration. Cavity contained mucopus.	Cavity contained a cyst; goblet cells +.
41. A. M., m.	50	Meningitis; ulcerative endocarditis.	Goblet cells +; œdema of submucosa; blood-vessels engorged and great amount of erectile tissue.	Goblet cells +; much erectile tissue.
42. R. R., m.	34	Abscess of brain.	Normal.	Normal.
43. J. S., f.	40	Mania; œdema of brain.	Normal; mucous glands numerous.	Submucosa a little thickened and vessels dilated; mucous glands numerous.
44. R. C., m.	54	Purulent leptomeningitis.	Normal.	Normal.
45. J. H., m.	61	Acute congestion of kidneys; œdema of brain.	Mucous membrane healthy; some œdema of submucosa.	Mucous membrane healthy; some œdema and dilatation of vessels in submucosa.
46. M. G., f.	39	Acute nephritis.	Normal; goblet cells +.	Normal; goblet cells +.
47. M. R., f.	19	Tuberculous meningitis.	Desquamation of superficial epithelium in places; great œdema of submucosa and much erectile tissue.	Similar to right; also erectile tissue and glands present.
48. T. S., m.	49	Aortic stenosis.	Normal.	Normal; glands and erectile tissue in submucosa.
49. J. G., m.	35	Acute pericarditis.	Normal.	Normal; goblet cells +; erectile tissue and glands.
50. W. T., m.	36	Not known.	Normal; erectile tissue.	Normal; erectile tissue.

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ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH,
ROYAL COLLEGE OF SURGEONS OF EDINBURGH,
AND ROYAL FACULTY OF PHYSICIANS AND
SURGEONS OF GLASGOW.

The following candidates, having passed the requisite examinations of the above Board in October, were admitted Diplomates in Public Health :—

T. G. Shand, Scotland ; G. M. B. Liddle, Ireland ; J. A. M. Clark, Scotland ; J. E. Spence, England ; Jessie H. Gellatly, Scotland ; G. Y. Richardson, Stirling ; A. McKendrick, Kirkcaldy ; Mary J. Menzies, Wakefield ; F. Anderson, Edinburgh ; J. W. Cairns, Edinburgh ; R. Fraser, Edinburgh ; D. J. McLeish, Crieff ; L. Gibson, Aberdeen ; F. P. Lauder, Bombay ; S. G. M'Allum, India ; M. B. G. Sinnette, Dundee ; Jane R. F. Gilmour, Duntocher ; R. Hannah, Grangemouth ; B. S. Tarapurwalla, Bombay ; E. H. Cramb, Bonnybridge (Stirlingshire) ; C. S. Hunter, Edinburgh ; B. Nath, India.

At the same sederunt the following candidates passed the First Examination in Public Health :—

Jessie J. Stooke, Dunfermline ; J. Robertson, Glasgow ; W. S. I. Robertson, Scotland ; E. W. Marsh, Rangoon (Burma) ; R. Massie, Edinburgh ; R. A. Krause, Innsbruck ; K. Fraser, Scotland ; Catherine Kirk, Scotland ; A. Wauchope, Scotland.

SCOPOLAMINE-MORPHINE AS AN OBSTETRIC
ANÆSTHETIC.

By H. RUTHVEN LAWRENCE, M.D., Ch.B.,

Senior House Surgeon, Salisbury Infirmary.

ALTHOUGH so much has been written on this subject that it may be almost considered now as past history, most of the cases recorded have been observed abroad, and apparently so few medical practitioners in this country have themselves tried the method to any extent, that it may be of interest to give a short account of its successful use in our own maternity hospital practice.

There are many points of interest in connection with the history of this subject which, however, cannot be included in the scope of this paper.

It will be generally admitted that an anæsthetic, under the influence of which a patient can be safely kept for practically the whole of the process of labour, would be a tremendous boon, both to patient and practitioner, and the drug which most nearly approaches this wished-for perfection is undoubtedly scopolamine or hyoscine.

Scopolamine is an alkaloid of the atropine series, and exists in three stereo-isomeric forms, the dextro levo and racemic modifications. The levo form is stated to act twice as strongly on peripheral nerve endings as the racemic form, and is therefore the more useful for our purpose. The alkaloid is also known as hyoscine, and is officially recognised by the British Pharmacopœia in the form of hyoscine hydrobromide.

The action of the drug produces a condition of natural sleep, with forgetfulness of the pain which has occurred while under its influence, and this result is more successfully attained by the use of small doses of morphine in combination with the hyoscine.

The first use of these substances for their anæsthetic action was made ten years ago by Schneiderlin, and since then an enormous number of writers have reported cases, both surgical and obstetrical, in which they have been used for this purpose.

The authorities with the largest experience in its use in pure obstetrics are undoubtedly Kronig and Gauss, of Freiburg, and upon their experiences have been based most of the investigations of the observers of the last few years.

The pharmacological action of the drug of most importance is

the production of sleep which is extremely natural in character, and comes on within half an hour, as a rule, and lasts for some hours. The hypnotic effect is, however, not quite so reliable as that of morphia. While the perception of pain is not entirely abrogated during this condition of narcosis, it is much dulled, and there is no remembrance, on waking, of the pain felt during sleep, although perception of it may, at the time, have been manifested. Very occasionally effects more like those of atropine are noticed, such as excitement, even delirium, but these usually only precede the onset of sleep. During this pre-hypnotic stage (when it occurs) are noticed giddiness, restlessness, indistinct speech, garrulity, and uncertain movements. A very constant result of the drug's action is mydriasis, and sometimes dryness of the mouth, and, less often, flushing of the face are noticed.

I have been told of one or two cases of collapse after the use of the drug, but have never seen it reported, or had it occur in my own experience. One case of idiosyncrasy has been reported. The effects upon the circulation and respiration of non-toxic doses is slight stimulation.

The action of morphine is too well known to need description; suffice it to say that by the administration of hyoscine and morphine together, we aim at obtaining the maximum of their hypnotic effect, with the neutralisation of their toxic action.

Morphine alone cannot, of course, be used as an obstetric anæsthetic, owing to its action in stopping the uterine contractions, apart from the hypnotic effect upon the child.

Hyoscine, on the other hand, does not interfere with the contraction of the uterus.

After hyoscine and morphine, chloroform or ether can safely be administered, and far less of these is required to produce surgical anæsthesia.

The condition we aim at obtaining is one of amnesia and analgesia, called by Kronig "*Dämmer Schlaf*," or twilight sleep, a sleep verging on consciousness.

The dosage varies from $\frac{1}{200}$ to $\frac{1}{100}$ gr. of scopolamine and $\frac{1}{8}$ to $\frac{1}{6}$ of morphine, depending upon the condition of the patient, the extent of the reaction to the pain, the stage of labour reached, and so on. Of course, if it appeared probable that the child would be born before the effect of the drug could be developed, it would be better to withhold scopolamine-morphine altogether, for chloroform would be more satisfactory for the short time remaining in which anæsthesia would be required.

As regards the dose, under most circumstances $\frac{1}{60}$ gr. of scopolamine, with $\frac{1}{6}$ gr. of morphine, is enough to begin with, and, if necessary, it can be repeated, with or without the morphine, in $\frac{3}{4}$ hour to $1\frac{1}{2}$ hours. The earlier in labour that the time arrives to give the injection, the bigger may the dose be, but it should not exceed $\frac{1}{100}$ gr., and repeat doses are usually kept at $\frac{1}{60}$ gr. I have found the best way to give the injection is straight into the buttock or thigh; the patient hardly notices it.

The first injection is given when the pains are strong and regular, lasting about 30 seconds, with intervals of about 5 minutes, and consists of scopolamine, $\frac{1}{60}$ gr., and morphine, $\frac{1}{6}$ gr. The effect is apparent $\frac{1}{2}$ hour to $\frac{3}{4}$ hour after. The patient sleeps between the pains, and wakes and cries out during the pains. Consciousness is not lost, so a second injection is given $\frac{3}{4}$ hour to 1 hour after the first, consisting of scopolamine, $\frac{1}{60}$ gr., alone. Half an hour later the patient's memory is tested by questions as to the number of injections made, examinations, objects shown to her previously, or small events which have occurred about her. If she remembers things for more than half an hour, she is not sufficiently under the influence of the drug. Further injections are given when memory begins to return. Morphine is only repeated if the patient becomes excited, or there is other reason for it.

The condition of the patient is now one of amnesia, not anaesthesia; she feels the pain, but immediately forgets it, and she should wake up afterwards remembering nothing at all about it. This can easily be obtained in 80 per cent. of cases. Kronig insists that correct dosing is essential, and the only test available is that of the patient's memory; therefore, to get *perfect* results, he says, "an uninterrupted observation of the patient by trained attendants is imperatively necessary." This is attainable only in hospital or the best private practice, but I have found that very excellent results can be got without such stringent observation after a little experience in the use of the drug. The patient should be kept quiet and undisturbed, in a darkened room, and plugging the ears with cotton-wool is of great assistance. The last pain, as the head is born, is always more acute than preceding ones, hence it sometimes penetrates the veil of oblivion, and on waking the patient thinks that the last acute pang is characteristic of the whole labour. For this reason, it is a great help to give a few whiffs of chloroform as the head passes the vulva, or 5 c.cm. of ethyl chloride may be substituted. Small doses of veronal have also been used.

When it is impossible for the practitioner to be in frequent attendance, the initial dose of scopolamine may be $\frac{1}{100}$ gr., with the usual $\frac{1}{6}$ gr. of morphine. If called to a case which has been in progress for some time, I have found it a good rule to give an injection if it is expected to last more than an hour longer; if it is likely to be over before that, it is barely worth while, and a better result can be got by the use of chloroform. If the labour is likely to last for a considerable time, one may return 3 or 4 hours after the first injection (of $\frac{1}{100}$ gr. scopolamine), and, if necessary, repeat it. If the pains are irregular and feeble, it is naturally better not to use the drug, and in cases of physical weakness or ill-health the patient should be watched more carefully. I have used the drug in conditions of organic heart disease and pulmonary tuberculosis with no bad effects.

In the list of cases upon which this paper is based, there were several series of experimental cases. At first only $\frac{1}{100}$ gr. of scopolamine was used, and was found to be too small to produce the desired effect. Then again scopolamine alone was used, and was found to produce a less calm and restful sleep and a greater tendency to excitement. The effect upon the children was marked when large doses ($\frac{1}{4}$ gr.) of morphine were used, they, in most cases, being born drowsy, or even requiring resuscitation. The combination of atropine with the larger dose of morphine was then tried, but without any better sequel.

After the labour is over the mother drops into a restful sleep, which lasts some hours, and she wakes up in a far fresher condition than when the drug is withheld. This was especially noticed and spontaneously remarked upon by many of the multiparous patients.

The effect upon the child is, in the great majority of cases, nil. In some the child is drowsy, but does not need resuscitation, and in a few cases some stimulation is necessary. None were born dangerously somnolent. From the cases in which experiments were made in dosage, the conclusion I drew was that the morphine element of the treatment was almost entirely to blame for the drowsy condition of the infants.

In no case could the death of a child be attributed to the use of the drugs.

There were no maternal deaths.

Although 126 cases were observed, only 90 of these may be called non-experimental; that is, they were treated according to the methods noted above.

The following table will give details of the results achieved :—

	Number.	Per cent.
Number of cases	90	—
Primiparae	47	52·2
Multiparae	43	47·7
Effect on mother—Slept	81	90·0
No effect	2	2·2
Excited	4	4·4
Delirious	3	3·3
Memory—Birth remembered	16	17·7
Birth not remembered	74	82·2
No difference to pain	3	3·3
Pain increased	2	2·2
Pain diminished	85	94·4
Effect on child—Lively	66	73·3
Drowsy	8	8·8
Resuscitated	12	13·3
Dead	5	5·5
Forceps cases—Total	24	26·6
With chloroform	19	21·1
Without chloroform	5	5·5
Complicated cases	17	18·8

* Including twins.

The large proportion of primiparae and of complicated cases is due to the fact that the majority treated were in-patients, and of these a larger percentage than usual consist of this class of case, for various reasons. The hospital taps a large area of country round Edinburgh, from which practically all the cases received are abnormal. Again, in the city, married women prefer to be attended in their own homes, and unmarried girls, most of whom are primiparae, must be admitted to hospital to receive treatment.

Those cases which became excited or delirious were easily calmed and got off to sleep by a few inhalations of chloroform.

The percentage of cases in which there was no recollection of the birth was high, compared with the experiences of others. This is partly explained by the fact that several had chloroform for delivery, either by forceps or naturally; in the latter case, a few whiffs being given as the head was born.

Although complete amnesia was not attained in every case, the pain was lessened in practically every one.

Most of the cases in which birth was remembered were due either to the child being born before the drug could take effect, or to the effect wearing off before the birth of the child, when,

owing to the imminence of the latter, it did not seem wise to repeat the injection.

Just over one-fifth of the forceps cases were delivered without chloroform being necessary.

Two children born vigorous died within three days; one had atelectasis, and the other was premature and had a depressed cranial fracture.

A large number of the children classed as "resuscitated" should have gone in under "drowsy." At first the drowsy ones were artificially stimulated, but later this was found to be quite unnecessary, as after a little sleep they woke up as lively as could be desired.

Of the five born dead, one was the result of craniotomy, two were premature and macerated, and two were dead as the result of operations for *accouchement forcé*.

In the foregoing series of cases it has been seen that there are both advantages and disadvantages in the use of scopalamine in labour. The advantages conferred upon the mother are very great, the total relief of pain and anxiety obtained in the successful cases being a boon the value of which it is not easy to estimate, and we have seen that in skilled and experienced hands the number of completely successful cases reaches 80 per cent.

The advantages obtained by its use are not confined entirely to the patient. It is a help to the busy practitioner in the conduct of his work, for he is able to produce an analgesia for his patient without having to be constantly present in person to administer chloroform or other anæsthetic during the pains. This, too, will assist him in the face of relatives and patient, who are impatient and anxious, and possibly losing faith in his skill, because they are unable to understand that labour is a process which must take its own time to pass through stages of preparation and expulsion, and cannot be brought to a speedy end by some simple manoeuvre comparable to drawing a tooth. The sight of the patient calmly sleeping through the pains is bound to have a reassuring effect on the relatives and friends. The freedom from exhaustion which follows its use is a powerful argument in its favour, and I have noticed again and again that multiparous patients have mentioned this even before the diminution of the pain or its abolition, in describing the differences between labours with and without scopalamine.

To turn to the disadvantages of the method, the list of reasons why the drug should not be used is a long one, but none of the

disadvantages urged against the drug are insurmountable. In the first place, in a small percentage of cases, the result is the opposite of that expected, and the patient becomes excited and incoherent. This condition need cause no alarm, however, and as a rule is overcome by a few inhalations of chloroform, or by a slight increase in the dose of morphine. The occurrence of thirst and flushing is rare, and is a mere nothing when compared to the actual pain of labour. Some observers contend that the sleep which usually follows the completion of delivery is a disadvantage, but I fail to see that this is so, and I consider it one of the beneficent actions of the drug, as the patient invariably wakes up much refreshed, and in a large number of cases, to her surprise, meets with the cheering news that her troubles are over, and that the cause and reward of them is sleeping peacefully in the cot at her side.

The chief argument against the use of scopolamine would seem to be the effect upon the child, but I think that the experiments in dosage with the morphine part of the treatment have shown pretty conclusively that the torpor of the babe is due to the latter drug. Careful individualisation of the dose, and the non-repetition of the morphine, whenever possible, will do much to remove this objection. Of course, the more experienced the practitioner becomes in the use of the drug, the better the results he will achieve.

With regard to the assertion that labour is prolonged, in my experience, except in one or two cases, this was not proved to have occurred, and when it did, I am not sure that the evidence is conclusive that the blame attached to the use of scopolamine-morphine.

This is a question which can only be settled by very careful observation of a large number of cases. If labour is prolonged by it, I do not think that a difference of more than half an hour on an average is caused; and, if it is, surely the relief from pain and anxiety is worth the extra time. Personally, I have never seen any ill effects upon pulse, heart, or respiration follow its use, nor has there been any harmful influence upon the third stage of labour or the puerperium.

To obtain the best results, care should be taken to use only drugs which are carefully and reliably standardised as to dosage, otherwise the effects caused will vary within very wide limits.

In conclusion, I may state that I consider this method of producing anaesthesia, in both normal and abnormal cases of labour,

to be a very valuable addition to the science of obstetrics. Although, to obtain *perfect* results, the patient should be under strict and trained medical observation, such as obtains only in an hospital, or the best class of private practice, still I think that it may be of enormous help to the busy medical man in all classes of practice, and the more each individual observer uses the method, the better the results he will obtain, for he will learn to discriminate between those cases which are likely to be benefited and those which are not.

For the opportunity of making these observations, while house surgeon at the Simpson Memorial Hospital, I am very greatly indebted both to Sir Halliday Croom and to Dr. F. W. N. Haultain.

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CONFERENCE OF THE BRITISH HOSPITALS ASSOCIATION.

AT the First Conference of the British Hospitals Association held in Glasgow on the 29th and 30th September, Mr. Loch dealt with the "Majority Point of View on the Poor Law as regards General and Special Hospitals." Incidentally Mr. Loch did not spare those who comprised the minority, nor did he mete out much sympathy to the socialistically inclined. He believes, however, that where a hospital is being utilised as a teaching centre it has as much right to a Government grant, or subsidy, as a secondary school, university, or polytechnic. The one is teaching technically as well as the others. To most medical men at least that must appeal as a logical view.

The discussion on the paper by A. Scott Finnie, Esq., F.S.A.A., Aberdeen, on "The Abuse of the Hospital and its Cure," was taken part in by several prominent managers and superintendents representing London, Glasgow, Edinburgh and the provinces, and tended to show that the prevailing "inside" opinion was that hospitals were *not* being abused. Dr. Macintosh, of the Glasgow Western Infirmary, was most emphatic on the "abuse" bogey. He said it did not exist. Divided opinions came from Edinburgh Royal Infirmary. Gossip had it that abuse was prevalent. It is well to know from those most directly interested in the financial control and management of such large establishments that gossip once again is a lying jade.

It may be comforting to those who labour at outdoor departments to learn that Dr. Macintosh strongly advocates the better financial reward of these younger men who, though possessed in many instances of outstanding ability, are compelled to give up the race for preferment on account of the lack of means.

On the second day Mrs. Sidney Webb's paper was held as read. Her doctrines were the view of the Minority of the Poor Law Commission. Mr. Motion, the inspector of the Glasgow Parish Council, was trenchant in his criticism of her principles, and others who followed were agreed that the day of the voluntary hospital was far from being ended. Mrs. Webb's belief that contributions would still pour into the coffers of the treasury, even were voluntary hospitals taken over by the municipality, was certainly not reciprocated by any of the speakers present. Nor does every-day experience incline one to believe that subscribers would continue to maintain rate-aided schemes in funds. Mrs. Webb's suggestion for a unified county medical service is ideal, but its practicability, or even its advisability, is seriously open to question. That infectious diseases should be transferred from the poor law to the local authority goes without saying, since the latter is concerned both with the causes and the effects of such diseases.

Dr. Nathan Raw, dealt with the "Institutional Treatment of Tuberculosis." His chief point consisted in the strong plea for the

treatment of early cases of tuberculosis in all voluntary hospitals. He would have special wards set apart for the purpose. Advanced cases, he thinks, ought to be segregated by the local authority. Few superintendents of voluntary hospitals will, we fear, agree with him. In Scotland the voluntary hospitals refer most of their cases of pulmonary tuberculosis to the local or poor law authorities, and these authorities accept the responsibility as a matter of course.

Dr. Raw gave as a reason for the treatment of early cases in voluntary hospitals the fact that students would never learn the open-air methods unless such a scheme was adopted. Here, again, Dr. Raw spoke from an English standpoint. Nearly every large teaching centre in Scotland now receives consumptives in wards or shelters connected with its fever hospitals.

Mr. West and Dr. MacIntosh deserve very high praise for the excellence of their syllabus and the general arrangements of the conference.

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RECENT LITERATURE.

CRITICAL SUMMARIES AND ABSTRACTS.

MEDICINE.

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EHRlich's RECENT WORK IN CONNECTION WITH THE SPECIFIC TREATMENT OF SYPHILIS AND OTHER DISEASES.

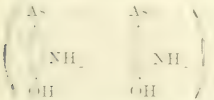
THE interest which has been excited by Ehrlich's discovery of a new specific remedy for syphilis is evinced by an almost continuous outpouring of papers dealing with the subject. In this review only a general outline of some of these is attempted; in particular, details as to the technique of treatment are omitted, because "606" (to give the drug its short name) is not as yet generally available, and when it is put into the hands of the profession a description of the proper mode of employing it will doubtless be supplied. Details of successful cases, also, are not given; to do so would involve much repetition, and there is no question that in syphilis the results of all observers show that the drug has a marvellous effect on the disease. The literature quoted, too, will be taken entirely from German sources, as, with one or two exceptions, only Professor Ehrlich's countrymen have had an opportunity of experimenting with the drug.

It would be a mistake to imagine that Ehrlich's discovery has been fortuitous or due to mere good luck. On the contrary, it is the outcome of years of study of the trypanosome group of diseases, and part of the work which led up to the production of "606" appeared in the *Berliner klinische Wochenschrift*, 4th to 25th March 1907, and was summarised in this column of the *Edinburgh Medical Journal* in May 1907. As Ehrlich states in a general paper on "Chemotherapy" (*Verhandlungen d. 17ten Kongresses f. inn. Med.*, Wiesbaden, 1910, S. 226), it was especially the study of "drug-fast" strains of trypanosome which threw so much light on the activity of medicines. By "drug-fast" strains are meant such strains as after repeated doses of a trypanicide (to which they are at first very susceptible) rapidly acquire the power of resisting the drug. In the papers above referred to the production of atoxyl-fast, fuchsin-fast, trypan-red-fast strains is described at some length. Further study showed that a parasiticide may anchor itself to the parasite by more than one set of receptors—*e.g.* arseno-phenylglycin, which contains an acetic acid molecule, and attaches itself to the trypanosome by its acetic acid as well as its arsenic group. This principle of multiplicity of receptors may be applied to the synthesis of specific parasiticides, by devising combinations of molecules or groups of molecules which are adapted to the receptors of a given organism. For trypanosomes the aceto-receptor affords an instance of this; in spirilla there exist other receptors—iodo-receptors and, in particular, amido-receptors, the latter of which led up to the discovery of dioxy-diamido-arseno-benzol—more conveniently, Ehrlich-Hata's drug, or "606," which is the most potent known spirillicide. In animal experiment, it has been conclusively shown that the best way of treating an infection of the kind under consideration (trypanosomiasis, spirillosis) is to give in one single dose a large enough quantity of the drug to sterilise the animal at once and therefore completely cure it. *A priori*, it is surprising that this can be possible, but repeated experiment has proved it to be so, thanks to the specific attraction of parasites for specific drugs. This act of sterilisation at a single blow Ehrlich designates "Therapia sterilizans magna." It can be carried out not only in the smaller laboratory animals, but in apes (Strong in Manila, Mesnil in the Pasteur Institute, Breinl in Liverpool). So far as sleeping sickness is concerned, the problem is complicated by the fact that Nature has already effected what Ehrlich has done experimentally—*viz.* created arsenic-fast strains of trypanosome. Thus the East African trypanosomes resist arsenic, while the Togoland type is extraordinarily sensitive to it. In Togoland the result of two small injections of arseno-phenylglycin destroys all the parasites and keeps the blood free of them for ten months at least. Conditions appear to be more favourable as regards the spirillosis. Iversen (*Monch. med. Wochenschr.*, 12th April 1910), who has treated a large number of cases of relapsing fever, has

formulated the following conclusions:—(1) A single injection of the soda salt of dioxy-diamido-arseno-benzol cuts short an attack of relapsing fever in 7 to 14, or at most 20, hours, and in 92 per cent. of cases prevents relapses entirely. (2) The dose required is from .2 to .3 gm. (3) Spirochaetes (spirilla) disappear from the blood in from 4 to 10 hours. (4) Some local irritation is caused by intra-muscular injection. (5) Intravenous injection is painless, no unpleasant symptoms arise, and the desired effect is attained more rapidly (by 3 to 4 hours) than with intramuscular injections.

In syphilis, as in sleeping sickness, the conditions are less simple than in relapsing fever, for in the normal course of the disease recurrence takes place, hence there must be more than one type ("recidiv-formen") of spirochaete. At present the results are surprisingly favourable with doses of .3 gm. of preparation "606" (5 mgr. per kilo of body weight), and as animals tolerate 20 to 30 times this dose, it is possible that much larger doses than those hitherto employed may prove safe in man. The principle of "Therapia sterilizans magna" is new, and is opposed to the older method of gradual dosage (*Etappenbehandlung*).

Hata (*Verhandlungen d. 17ten Kongresses f. inn. Med.*, S. 235) summarizes his work on the spirillum of relapsing fever, on fowl spirillosis, and on the syphilis of rabbits. The course of relapsing fever in mice resembles that of the disease in man, but the mortality is higher and can be varied by increasing the dose and virulence of the inoculated material. Twenty-four hours after inoculation, when the spirillum can be recognised in the blood, a single injection of the drug to be tested is given. After testing a number of substances he found that certain arsenical preparations, of which dioxy-diamido-arseno-benzol

 is the best representative, were germicidal enough

to bring about a cure after a single dose. The maximum dose tolerated being .2 gm. per kilo, the curative dose was only .06 gm. per kilo. The bad effects of atoxyl and arsacetin (tremor and amaurosis) were never observed. Fowl spirillosis is more easily cured. Comparison of a series of these drugs, as in the subjoined table, shows how great is the difference between atoxyl, the most poisonous and least germicidal, and "606."

	Dose tolerated, per kilo.	Curative dose, per kilo.
Atoxyl . . . . .	.06	.03
Arsacetin . . . . .	.1	.03
Arseno-phenyl-glycin . . . . .	.4	.12
Dioxy-diamido-arseno-benzol . . . . .	.2	.0035

Another interesting point which emerged from Hata's experiments

was, that while both intravenous and intramuscular injections acted as prophylactics against infection, the effect was much more prolonged in the latter than in the former method of administration. The reason for this is that when "606" is injected into a muscle, coagulation of the muscle fibres occurs, and a depot of the drug forms, from which absorption is gradual. This observation has obvious bearings on the clinical use of the remedy. The syphilis of rabbits occurs in three forms—keratitis, scrotal chancre, and orchitis. The second, which resembles the hard sore in man, was chosen as the test lesion. In rabbits a dose of "606" equal to $\frac{1}{10}$ to $\frac{1}{2}$ of the maximum tolerated caused rapid disappearance of the spirochaetes and healing of the chancre. For experimental work on rabbit syphilis, see also Uhlenhuth (*Deutsch. med. Wochenschr.*, 29th April 1910).

One of the first communications concerning the use of "606" in man was made by Alt (*Munch. med. Wochenschr.*, 15th March 1910). His patients were chiefly general paralytics and other cases of parasyphilis. He also used arseno-phenyl-glycin, giving injections of .8 to 1 gm. on two successive days. After the second injection fever, vomiting and quickening of the pulse were noticed. In 10 to 15 per cent. of the cases there was a scarlatiniform rash and high temperature, which subsided in a few days. In all, 140 cases received this treatment; some were watched for a year, and in no case did blindness or any other bad result follow. Of these patients 121 gave a positive Wassermann reaction, and in 20 cases this disappeared entirely, in 13 partially, after treatment. The only cases which improved very markedly were 4 cases of juvenile epilepsy. He next tried "606" on 23 cases of general paralysis; of these 7 lost or partially lost the Wassermann reaction they previously gave. The drug was then tried in recent syphilis by Schreiber, with remarkable results. Such rapid and complete curative action, even in obstinate cases, has never been seen after any other method of treatment. Primary sores begin to regress within a few days, the sclerosis vanishes, rashes fade, ulcers of the labia heal, mucous patches and condylomata vanish; a large obstinate tertiary ulcer was cicatrised completely in 3 weeks. Syphilitic sore throat yields in a few days. Of 27 cases treated between 1st January and 7th March, 4 had at the latter date lost the Wassermann reaction. Hoppe and Schreiber (*Verhandlungen d. 17ten Kongresses f. inn. Med.*, 1910, S. 242) report on 100 cases of syphilis treated with intramuscular injections of .3 gm. or intravenous injections of .2 gm. In all cases, without exception, the manifestations of syphilis yielded rapidly. About a quarter of the patients had a slight rise of temperature. No albuminuria or glycosuria was produced. A scarlatiniform rash was noticed twice, 10 days after injection. Leucocytosis has been observed by several workers after injection with the drug. Of 25 patients giving a positive Wassermann who were under observation for 40 days, 23 lost the

reaction. The loss of the reaction usually occurs about the fourteenth day; it was twice noted as early as the fourth and sixth days respectively. The disappearance of Wassermann's reaction is not due, as might be thought, to the direct action of the drug on the blood, for it has been shown (Schwarz and Flemming, *Münch. med. Wochenschr.*, 13th September 1910; Bruch, *Wien. klin. Wochenschr.*, No. 15, 1910) that neither "606," arseno-phenyl-glycin, potassium iodide, nor mercury, interfere with the reaction *in vitro*. Hoppe and Schreiber have succeeded in abolishing Wassermann's reaction by treatment with mercury in only 43 per cent. of cases. In some cases the immediate result of injection is to cause a preliminary intensification of Wassermann's reaction before abolishing it (Iversen, *Münch. med. Wochenschr.*, 16th August 1910).

Some further points drawn from a number of papers are worthy of mention. After intravenous injection the drug is excreted rapidly, no arsenic being discoverable in the urine after 4 days. With intramuscular injection excretion takes place more slowly—5 days in recent syphilis, 10 days in general paralysis. Herxheimer's reaction has been observed by several who have used the remedy (Loeb, *Münch. med. Wochenschr.*, 26th July 1900). It occurs usually where there is a well-marked secondary rash, and when the dose is small. It consists in a marked transient exacerbation of the rash, and is ascribed to the dose having been too small to kill the spirochætes, but strong enough to irritate them and provoke a response. Recidives have occurred in one or two patients treated; these yield readily to mercury, and it does not seem as though a patient having had mercury previously contra-indicates the use of "606," or *vice versa*. Spirochætes disappear from the juice of the lymphatic glands within a few days after injection (Iversen, *Münch. med. Wochenschr.*, 16th August 1910).

In 2 fatal cases of hereditary syphilis marked degeneration of spirochætes was made out after treatment by "606" (Herxheimer, *Deutsch. med. Wochenschr.*, 29th September 1910). A very interesting observation was made by Taege (*Münch. med. Wochenschr.*, 16th August 1910), and confirmed by Dubot (*Ibid.*, 30th August 1910). Both these writers saw cure of bad hereditary syphilis—bullæ on soles, &c.—by giving "606" to the mother, who was suckling. The remarkable thing, however, is that no arsenic was detected in the milk in either case. Ehrlich, to whom the cases were submitted, suggested that what had probably happened was that the destruction of the spirochætes in the mother's tissues had set free endotoxins, which gave rise to antitoxins, and that the latter came over in the milk. Apart from this, to cure hereditary syphilitic pemphigus in a newly-born child in the course of a few days is a feat beyond the power of mercury as ordinarily administered. Fraenckel and Grouven (*Münch. med. Wochenschr.*, 23rd August 1910) in a paper on the treatment of syphilitic nervous

disease by "606" have to report one death, which occurred suddenly soon after an intravenous injection of .4 gm. By accident the dilution was insufficient. The patient had advanced disease of the brain. Ehrlich, commenting on this and one or two similar fatalities, now lays it down as a rule that the drug must not be given in cases of advanced cerebral mischief. He does not believe that intravenous injections are in themselves dangerous. Fraenckel used doses rising to .9 gm. Treupel claims that the results are very good in cerebral syphilis, less favourable in tabes, comparatively slight in general paralysis (*Deutsch. med. Wochenschr.*, 29th September 1910).

A few observers have used the remedy with benefit in such non-syphilitic skin diseases as lichen planus and psoriasis. It has failed in leprosy (Ehlers, *Munch. med. Wochenschr.*, 11th October 1910). Werner (*Deutsch. med. Wochenschr.*, 29th September 1910) finds it an active antimalarial remedy, most effective against tertian ague. A single dose of .6 gm. removes the plasmodium from the peripheral blood in 24 hours. In continued fever the action is not so rapid.

On the basis of 375 cases treated in Wechselsmann's Clinic, Sieskind lays down the following indications and contra-indications (*Munch. med. Wochenschr.*, 27th September 1910):—

Indications.—(1) Malignant syphilis or cases refractory to mercury. (2) If mercury is not tolerated. (3) When relapses occur in spite of mercury. (4) Early cases, before the appearance of secondaries, possibly along with excision of the primary sore. (5) Tuberculous syphilitic patients, for in them mercury acts unfavourably on the tuberculosis. (6) Visceral syphilis, including epilepsy. (7) Decrepit patients, if the eyes, heart and lungs are healthy. (8) Latent syphilis, if in spite of mercury and iodide the Wassermann reaction is present. (9) Parasyphilis in its earliest stage.

Contra-indications.—(1) Serious non-syphilitic retinal diseases and affections of the optic nerve. (2) Serious cardiac and vascular lesions. (3) Serious lung disease, except tuberculosis. (4) Advanced renal disease of non-syphilitic origin. (5) Advanced cerebral mischief. (6) Temporary febrile ailments constitute a contra-indication for the time being.

SURGERY.

THE EHRLICH-HATA REMEDY FOR SYPHILIS.

THE literature of "606" or, to give it its full name, dioxy-diamido-arseno-benzol ($C_{12}H_{12}O_2N_2As_2$) is already very large, and increases in volume every week. It cannot be said, however, that anything very new has appeared on the subject of late. Perhaps the fact of most

interest to the profession is the announcement in the *New York Medical Journal* of 17th September that they have received a communication from Professor Ehrlich, in which he informs them that tubes of "606" will be for sale in Germany on 1st November through Farbwerke Hoechst, and in the United States and Canada through Victor Koechl & Co. of New York. As to whether it will also be obtainable in Great Britain at that date is not stated.

Without going into the history of the drug, or its exact composition, or dealing individually with the literature, it may be useful briefly to summarise, chiefly from the clinical aspect, the main facts known regarding "606" at the present date. In the first place, it is satisfactory to record that the later evidence is practically unanimous in upholding the earlier claim that in the great majority of cases "606" causes the disappearance of the lesions of acquired syphilis, whether primary, secondary, or tertiary, in a much more rapid manner than any drug hitherto employed. Improvement has indeed been noted in many cases within a few hours of injection. The immediate relief of severe pain of syphilitic origin has been emphasised by numerous observers. In some cases of parasyphilis marked improvement has occurred. Its potency in congenital syphilis appears as great as in the acquired form.

During a visit to Berlin in September the writer of the present abstract was enabled, through the courtesy of Professor Wechsellmann, to see something of his cases under treatment at the Virchow Hospital. At that date Wechsellmann had treated over 600 patients with "606." A large variety of cases were examined, and there could be no question as to the surprising character of the *immediate* results obtained. Specially striking were cases of malignant syphilis and patients who had proved refractory to prolonged treatment by mercury and iodides.

Pain at the site of injection is not present when the intravenous method is employed, but in most cases there is a pronounced general reaction in four to six hours, viz. elevation of pulse and temperature (the latter rising to 101° F. or even 103° F.), along with malaise and vomiting. This lasts for a variable period, but the patient is usually perfectly well next morning. With regard to the subcutaneous and intramuscular methods, the reports of different clinics are somewhat conflicting. In most cases some local pain results, and in a proportion of patients the pain is severe enough to necessitate the use of morphia. The general reaction is slight or absent.

Apparently much depends on whether the injection is bulky or not. In some cases where the usual injection (20 c.c.) was made in two portions (of 10 c.c.), pain was found to be much less than when the total amount was given. More important, however, is to use an exactly neutral injection.

In Wechsellmann's clinic the patients received a subcutaneous

injection of this nature, and those questioned by the writer either said they had no pain or made light of it.

The dose of "606" employed ranges from 0.2 grm. to 0.8 grm. An average dose for an adult male is 0.6 grm. (9 grs.).

In not a few cases it has been found necessary to repeat the injection owing to return of symptoms or incomplete removal of symptoms.

Serious accidents (due to the drug) seem to be of very rare occurrence, and, out of the several thousand cases that have now been treated, no case of blindness has occurred.

So far, three deaths have been *published*. Two of these were infants suffering from pronounced congenital syphilitic marasmus, in which injections were given as a forlorn hope. The third case showed at the post-mortem evidence of extensive cerebral disease. It is to be hoped that all fatal cases have been published.

Finally, with regard to the statements—fortunately almost entirely confined to the lay press—that in "606" a *cure* for syphilis had been found, it seems hardly necessary to point out that years must elapse before any such pronouncement can be made. The fact, however, that in most cases within three days, and in some cases within twenty-four hours, after a single injection no spirochætæ can be demonstrated after repeated examinations in patients who, before injection, were found to be swarming with them, is very striking. The disappearance of the Wassermann reaction in the majority of cases is also significant. It, however, seldom disappears under a week, and may not do so for six weeks. This may account to some extent for the varying reports as to the exact percentage of negative reactions met with after injections. The sense of well-being experienced by patients after the initial discomforts of the injection are over and the marked gain in weight in many cases are points in which there seems to be general agreement.

A. A. SCOT-SKIRVING.

THE PRESENT STATUS OF THE TREATMENT OF EXOPHTHALMIC GOITRE.

Numerous theories have been brought forward as to the cause of exophthalmic goitre; that which Jackson and Eastman (*Boston Med. and Surg. Journ.*, 15th September 1910) hold, is the now generally recognised one—that the thyroid gland is alone responsible for the disease; it is the only theory that has survived, and is borne out by experimental and clinical evidence. They discuss how the hypersecretion of the gland causes the symptoms, but the only reason suggested as the starting-point of this condition is mental shock. (The rarity of this result of mental shock, however, must surely prove that it alone is not sufficient.)

They believe the symptoms to be due to the hypersecretion acting

on the sympathetic system, "perhaps directly on the chromaffin substance which it contains, which is in itself a gland, and therefore most likely to be acted upon by another gland, as is so frequently the case," and suggest the possibility of a vicious circle—mental shock, increased thyroid secretion (through the sympathetic), reaction on the sympathetic nervous system. They further note, in favour of this theory, that Falta has shown that the cells of the chromaffin system and those of the medulla of the suprarenal gland are similar.

With regard to diagnosis, they consider myocarditis to be the most constant lesion of the disease; abnormalities of position of the gland should be looked for, especially the so-called dipping thyroid, as it is in such cases that sudden pressure symptoms sometimes develop. They mention Kocher's work on the blood in relation to this condition. A further point of importance, not only in regard to diagnosis, but also to treatment, is that hypersecretion may be going on in one part of the gland while degenerative changes are taking place in another. The natural cure of a case of Graves' disease is by degenerative changes following on the hyperactivity of the gland. It has been stated that 50 per cent. of patients suffering from this disease recover, if they can be tided over the acute stage. How can this best be accomplished? By both medical and surgical treatment; and the writers lay special stress on this being a condition in which the physician and surgeon should work together from the commencement of the case. The great essential of medical treatment is both physical and mental rest; drugs they consider of little value, but recommend the prolonged use of a neutral salt of hydrobromide of quinine, first suggested by Forchheimer. Thyroidectin and serum treatment have not given any permanently good results. The serum treatment depending upon the somewhat complicated theory of Rogers and Beebe is mentioned. Electricity as an adjunct has been found useful.

Most cases should be treated medically for at least three months, but certain types, especially those in which there is danger by mechanical compression, should be operated on at once, *e.g.* the so-called dipping thyroid. If under medical treatment no improvement takes place at the end of three months, the surgeon should operate. The technique of the surgical treatment is shortly mentioned, and Crile's method of "stealing the gland" is advocated. An enlarged thymus, if it can be diagnosed, is a contra-indication to surgical interference, as is also an acute exacerbation. They recognise the fact that there is still much to learn regarding this interesting condition.

In the same journal there is a paper on "The Surgical Treatment of Exophthalmic Goitre" by Dr. Charles A. Porter, who advocates surgical interference, in which the sound judgment as well as the operative skill of the surgeon must be brought to bear on the case. One must not look upon the surgical treatment of Graves' disease as

one looks on an operation for fibroids or appendicitis; in the latter cases the operation cures the condition by the removal, in Graves' disease the operation only attempts to modify the function of an over-active gland. For surgical success the operation must be carried out before the condition has developed to any great extent; if this be done a permanent improvement, if not a permanent cure, can be obtained.

GEORGE CHIENE.

GASTRO-MESENTERIC ILEUS.

Acute gastro- or arterio-mesenteric ileus, or, as it is more commonly called, acute dilatation of the stomach, has been known for nearly forty years (Fagge, *Guy's Hospital Reports*, 1872-3). Most of the literature, however, has accumulated since 1902, and it was exhaustively reviewed by Laffer (*Annals of Surgery*, March and April 1908). Of 217 cases, 97 occurred after operations, and 60 of these were abdominal. The condition was most frequent after operations on the gall-bladder, next on the kidney, and next on the appendix. Two elaborate publications on the subject have appeared this year, one by Nakahara (*Beitr. z. klin. Chir.*, Bd. lxiv. H. 1), and the other by v. Haberer (*Arch. f. klin. Chir.*, Bd. lxxxix. H. 3). Though various factors appear to be concerned in its production, it is generally accepted that the essential cause is pressure on the duodenum by traction on the root of the mesentery, in the folds of which is the superior mesenteric artery. Occasionally the gastro-duodenal dilatation does not reach so far as the mesenteric ligament, and Ochsner seeks to explain some of these cases by a sphincteric action of a circular thickening in the muscular coat below the entrance of the common bile-duct (*Amer. Journ. Med. Sci.*, July 1906). In others, the obstruction is due to adhesions of the duodenum to the gall-bladder (Schwyzer, *Annals of Surgery*, September 1910). It has been shown experimentally that traction on the mesentery by prolapse of the collapsed small intestine into the pelvis is often sufficient to prevent the flow of fluids and gas through the third part of the duodenum. Obstruction is specially apt to occur when the root of the mesentery is constricted into a cord, and prolapse of the stomach, transverse colon, or kidney has a favouring influence (Staveley, *Surgery, Gynecology and Obstetrics*, September 1910).

A typical attack begins with pain in the epigastrium and persistent or frequent vomiting. Subsequently, as the stomach wall becomes weaker, the pain decreases, and large quantities of a dark-green or brown fluid are ejected at longer or shorter intervals. When the stomach is completely paralysed, vomiting ceases, the patient rapidly becomes prostrate, and may die in a day or two. The treatment consists in giving nothing by the mouth, frequently washing out the

stomach, and making the patient lie in the prone position to relax the pressure of the mesentery on the duodenum. Some surgeons recommend gastro-enterostomy.

Some attempts have been made to establish the existence of a chronic form of gastro-mesenteric ileus. In 1891 Kundrat expressed his belief that an incomplete obstruction might result from pressure by the root of the mesentery (*Wien. klin. Wochenschr.*, 1891). Albrecht stated that many cases of acute ileus were probably due to exacerbations of a chronic obstruction (*Arch. f. Path. Anat.*, 1899). Deaver observed the condition in a number of biliary and gastric affections, and believed that many patients in whom the pylorus was patulous in spite of symptoms of pyloric obstruction, were really suffering from duodenal obstruction. Still more direct evidence is brought forward by Staveley (*loc. cit.*), who, in the course of a critical survey of the literature, records two cases that came under his own observation. The first was in a woman, aged thirty-four, who had had indigestion for seven years, and, during that period, had about twenty severe attacks in which "the stomach became so distended that she lost consciousness." When the abdomen was opened the distension was found to extend to the root of the mesentery, and the dilated duodenum was anastomosed to the jejunum with most satisfactory results. The second patient had an even longer history of indigestion, with frequent exacerbations. In January 1909 a gall-stone was removed and the gall-bladder drained. At that time dilatation of the stomach and duodenum was noticed, but no steps were taken to cure it. The vomiting of dark-green material continued, and later a feeling of tightness and discomfort succeeded every meal. These symptoms were, however, relieved if she adopted the knee-elbow posture for fifteen minutes. Staveley also mentions cases of gastro-duodenal distension, one operated on successfully and two found after death by Robinson, one explored by Bloodgood, who first suggested the operation of duodeno-jejunostomy, and one operated on by Christian. Thus the matter rests at present, but Staveley's communication will stimulate the search for cases of chronic gastro-mesenteric ileus.

JAS. LOCHHEAD.

A SIMPLIFIED METHOD FOR THE TRANSFUSION OF BLOOD.

Fauntleyroy (*Med. Rec.*, 3rd September 1910) describes a simple technique for the transfusion of blood. The method consists in a vein-to-vein anastomosis by means of a curved glass tube, one-eighth inch in diameter and three inches in a straight line from tip to tip; each end of the tube is flanged to prevent slipping. The tubes are prepared by dropping them into melted paraffin, the excess of which is got rid of by shaking, and when the tube is cool the outer layer of

paraffin is wiped off. A tourniquet is applied to the donor's arm so that the veins are distended without the pulse being affected. The median basilic veins of both donor and recipient are exposed, the former's vein being ligatured above and the recipient's at the lower angle of the wound. The donor's vein is gently clamped, cut across below the ligature, and the end of the glass tube inserted for a quarter of an inch and tied. A valve-like opening in the recipient's vein is now made in the same manner as for salt infusion; the clamp is removed from the donor's vein, and as the blood flows from the tube the latter is inserted into the slit in the recipient's vein and secured by a ligature. The tourniquet on the donor's arm is sufficient to force the blood into the receiving vein. In the author's cases the anastomosis was kept up for thirty minutes. The writer does not claim originality in the vein-to-vein method, but he does claim that the use of the curved tubes, as indicated, will greatly facilitate the use of this method in the hands of the general surgeon.

JAMES M. GRAHAM.

DISEASES OF CHILDREN.

By G. H. MELVILLE DUNLOP, M.D., F.R.C.P.,
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THE CLINICAL SIGNS OF HYPERTROPHY OF THE THYMUS (D'Élsnitz, *La Presse Méd.*, 9th April 1910).

THE writer has drawn the following observations from six cases, varying in age from six months to three years, in each of which the condition was diagnosed during life, and subsequently confirmed by post-mortem examination.

The functional symptoms of hypertrophy of the thymus may be recognised by the following signs:—

Dyspnoea, accompanied by stridor, is almost invariably present. The dyspnoea is a permanent symptom, but is much aggravated by the recumbent position and by hyperextension of the head. Suffocative attacks, more or less frequent, may either complicate the dyspnoeic condition or may suddenly supervene in children apparently in good health. These attacks generally occur at night, and are accompanied by considerable cyanosis, bearing a strong resemblance to the condition of a child suffering from suffocative diphtheria. In a certain number of cases the respiratory troubles commence with the appearance of laryngitis stridulus, and the possibility of an enlarged thymus should always be kept in mind when an attack of this nature is of unusual intensity and duration. Congenital stridor with suffocative attacks has frequently been proved after death to be due to the presence of an

enlarged thymus. Elevation of temperature is frequently present, the attack being possibly caused by some alteration in the size and consistence of the gland, induced by some feverish condition. In most cases there is noticed some persistent cyanosis of the face and distension of the veins of the neck. On inspection of the chest an asymmetrical arching of the manubrium sterni, and of the upper two costal cartilages, usually on the right side, was observed in all cases, and this condition was confirmed on palpation.

On percussion a dull area was found extending up from the cardiac dulness to the right side of the manubrium sterni and beyond, exactly in the position of the abnormal arching. Radiograms confirmed those observations by showing an abnormal shadow occupying precisely the same area. In one case where the projection of the upper costal cartilages was on the left side, percussion and a radiogram confirmed the supposition that the main part of the hypertrophied gland lay towards that side.

THE HÆMORRHAGIC DISEASE OF THE NEW-BORN (Schwarz and Ottenberg, *Amer. Journ. of Med. Sci.*, July 1910).

In discussing the hæmorrhagic disease of the new-born it is necessary to keep in mind that it is not one disease, but is a symptom which may be due to a number of different causes. All cases, however, have two characteristics in common—(a) the bleeding is uncontrollable, and (b) the blood coagulates very slowly or not at all. The cases are clinically divided into two classes, viz. cases of multiple hæmorrhages, and those which occur from one place only. Cases of multiple hæmorrhages from mucous surfaces and internal organs generally show some febrile symptoms, and are often due to some form of infection, though their bacteriology is not very well established. Two special clinical varieties have been described. In one, known as Buhl's disease, the hæmorrhages are accompanied by cyanosis and icterus but no fever, and a marked fatty degeneration of the organs is characteristic.

The second variety, known as Winckel's disease, occurs usually in epidemics in institutions; besides the hæmorrhages, there occurs hæmoglobinuria and icterus. Among the causes of multiple hæmorrhages in infants are congenital stenosis of the bile ducts, cirrhosis of the liver, leukemia, and pseudo-leukemia. Congenital syphilis may cause either multiple hæmorrhages or bleeding from one point only. Finkelstein believes from a study of seven cases that the hæmorrhages are always due to a secondary bacterial infection. Cases of hæmorrhages from a single region, with certain possible exceptions, are probably due to the same causes as multiple hæmorrhages. The bleeding in some cases is connected with a local infection at the bleeding point. The most common sources are the umbilicus and the intestine. Umbilical hæmorrhage usually comes from the stump of an infected cord, and

begins during the first or second week of life. It is generally a slow oozing, and may last for days. It is usually not a fatal affection. Hæmorrhage from the bowel in infants may be due to a variety of causes. "Melæna neonatorum idiopathica" is a term applied to those cases which cannot be ascribed to syphilis, sepsis, or a local lesion. Vaginal hæmorrhage in infants is very rare; of seven cases collected by Ritter, four were due to septic infections. Nasal hæmorrhage is usually due to syphilitic rhinitis. Hæmophilia naturally suggests itself as a cause of new-born hæmorrhages, especially in view of the fact that in hæmophilia also the coagulatory power of the blood is impaired. As a matter of fact, however, hæmophiliacs very rarely begin to bleed in the first few months of life, and when they do, a fatal result rarely occurs.

Impaired blood coagulation is the essential cause of these uncontrollable hæmorrhages. In the opinion of the authors, this impaired coagulation is due neither to the absence or diminished amount of fibrinogen, nor to the absence or diminution of calcium, but to the destruction of, or interference with, the production of thrombokinasé—a definite ferment anomaly of all the body cells. The use of serum by subcutaneous or intravenous injection in the treatment of these hæmorrhages is new, and is still *sub judice*; and although many favourable cases have been reported, the authors are sceptical as to the value of this form of treatment. Transfusion has been used successfully in many hæmorrhagic cases, particularly in those due to prolonged jaundice. Transfusion not only replaces the lost blood, but stops the bleeding by supplying new material for the production of fibrin ferment. Transfusion cannot claim, however, to remove the original cause of the disease.

OBSERVATIONS ON THE BRUITS HEARD OVER THE MANUBRIUM STERNI IN CHILDREN (*Brit. Journ. of Children's Diseases*, July 1910).

The objects of this paper are—(1) to point out that bruits are very frequently heard upon auscultation over the upper part of the sternum in children when the head is bent back, so that the face is horizontal; and (2) to show how the bruits are produced.

Out of 500 children examined, the bruit was distinctly heard in 65, viz. 13 per cent., when the neck was extended as described above. The bruit was not always heard immediately when the head was bent back, but became obvious after a short period. It was exactly like the venous hum heard in the neck of girls suffering from chlorosis, but was usually not so long, and rarely continuous. It always disappeared when the head was carried to the erect position. Dr. Eustace Smith considered that this bruit was caused by pressure on the left innominate vein by enlarged mediastinal glands, his

explanation being that the bending back of the head tilts forward the trachea, with the glands lying at its bifurcation, and that the left innominate vein is pressed between the enlarged glands and the sternum. The author, while admitting that enlarged glands may cause a venous hum by compression, is unable to believe that this is the cause in the large percentage of cases in which the bruit is heard, and he further considers that the bruit is of little diagnostic importance of enlarged glands, apart from other physical signs.

In trying to discover the cause of these bruits he found that whenever the bruit was heard over the sternum it was also heard over the neck on one or other side. At first it appeared as though the bruit was conducted into the internal jugular veins, but it soon became evident that the bruit in them was louder than over the sternum.

Not much reliance can be placed upon the position of maximum intensity of the bruit as indicating the site of its production, but further considerations of the bruit help in deciding the point of origin. Thus it was found (1) that in all cases in which a bruit could be heard over the sternum, it was always audible in the neck; and (2) that a bruit was often heard in the neck, when the head was bent back, without its being audible over the sternum. The only conclusions arrived at from these two facts are, that in many children a bruit is produced in the internal jugular veins by the head being bent back, and that it depends on the loudness of the sound whether it can be heard over the sternum.

From these observations it would appear that the venous hum is produced in the internal jugular vein, and that it is conducted to the upper part of the sternum. It is far more likely that the bruit should be conducted in the direction of the blood-stream than that it should travel in the opposite direction. If the bruit, which is heard over the sternum, be produced by enlarged glands pressing the left innominate vein against the sternum, as Dr. Eustace Smith supposes, any conduction of the bruit backwards along the vein would be expected to show itself over the left internal jugular or left subclavian vein. This does not agree with the writer's observations, for in the majority of cases it was on both sides, and sometimes only on the right. It seems, therefore, most probable that the bruit arises in one or both jugulars, and is conducted downwards to the sternum.

Granting that the bruit arises in the internal jugular vein, it is easy to understand how it is produced. Bending the head back puts the veins on the stretch, and causes them to be compressed against the transverse processes of the lower cervical vertebræ. The sternomastoid muscle also compresses them, for it becomes tense when the head is thrown back. The stretching of the vein and its compression must diminish the size of its lumen over a certain portion, and therefore a condition is produced in the vein which is likely to give rise to a

bruit. The venous hum over the sternum, with the head thrown back, appears, therefore, to be a normal condition in the great majority of cases, and should be considered of no importance unless accompanied by physical signs of compression.

DISEASES OF THE EYE.

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IT is curious to notice how certain diseases or pathological conditions have their seasons of enhanced or diminished attention. Neglected for a time, it may be for a long period, they rise again into prominence, and numerous articles appear in the journals on the subject, it may be because of some new light cast upon their phenomena as some problem in general medicine takes an onward stride, or it may be from no very obvious reason that one can discover; again the interest dies down, and the subject is shelved for a time.

Two pathological conditions of the eye seem to be on the summit of the wave just now, namely, arterio-sclerosis and phlyctenular disease, and with these we shall deal briefly.

ARTERIO-SCLEROSIS.

Arterio-sclerosis has at least this special point of interest and importance in connection with the eye, that it is to a very large extent a disease of small arteries, say of the size of the radial and smaller, down even to the arterioles, and that there are no small arteries anywhere in the body situated in circumstances which lend themselves to close examination so favourably as those in the retina, where they can be seen lying in a transparent tissue—for the retina is, under normal conditions, perfectly transparent—and can be inspected under considerable magnification. We may meantime take it for granted that Russell is right in holding that the first step in the establishment of arterio-sclerosis is the existence in the circulating blood of some toxic substance or substances whose presence causes contraction of the muscular tissue of the vessel walls and thickening of the tunica intima. We have no need to suppose that the changes which occur in the vessels of the retina are in their essence different from those which affect the vessels of other organs, and these in general terms are an interference here and there with the blood supply on account of thickening of the walls and encroachment upon the lumen of the arteries, with consequent failure of due nutrition to the finer tissue elements and loss of function on their part. Writing on

this subject some time ago, De Schweinitz urged that we should distinguish between the early or suggestive indications and the later signs of the fully established condition. The former or suggestive signs are of course not a little subtle, and are not easy to identify as being actually pathological, but may be quite genuine. Briefly put, they are slight irregularities in the calibre, an enhanced degree of tortuosity of the vessels, and the light reflex showing just a very little more definitely than is quite normal. The pathognomonic signs are the same, of course, but carried to a higher degree—the arteries varying distinctly in calibre in different parts of their transit across the fundus, their hard, brittle-looking, or silvered aspect, and the compression exercised on the veins where at any point such a rigid artery may pass superficial to one of them. By the time this stage is reached, too, there may be minute hæmorrhages and indications of perivasculitis. It is these small hæmorrhages which point so strongly to the dangerous condition in which the patient stands—danger of a cerebral vessel giving way and permitting a serious or a fatal hæmorrhage to take place, danger of thrombosis occurring with not dissimilar results. Let it be remembered that arterio-sclerosis is a disease not confined to the vessels of the aged, as one is apt to assume too readily.

There was at one time a great deal of discussion as to the origin of embolism of the retinal artery, a condition which one sees from time to time; there seems to be little reason to doubt that in a goodly proportion of the cases so called, the rapid or sudden closure, whether temporary or permanent, of the retinal artery takes its origin in this morbid change in the vessel walls; there are many cases in which, whatever the cause may have been, it is perfectly clear on investigation that a true embolus could not have been the origin of the symptoms and signs present. Nor is it improbable that a considerable number of the cases of glaucoma take their origin in a pathological condition of the vessel walls, which is itself first started by the presence of some toxins or other morbid constituents in the blood, and that the earlier and with the more certainty we can arrive at a diagnosis of the preliminary condition, the better for our patients. A physician would in not a few puzzling and doubtful cases be materially helped by a report upon the appearance of the vessel walls as seen in the fundus.

PHLYCTENULAR CONJUNCTIVITIS.

Phlyctenular conjunctivitis has from time immemorial been looked upon as an indication of the strumous or scrofulous diathesis, a term whose vagueness corresponded fairly well with the nebulous character of the ideas regarding it. One of the great difficulties in the way of regarding the condition as definitely tuberculous is the admitted rarity with which it occurs in persons definitely affected with

tuberculosis. It has therefore been suggested that phlyctenules might be a sign of the presence of dead tubercle germs in the system, a proposition difficult alike of proof and disproof. Czerny, writing in a journal of children's diseases, expresses his disbelief in the association of the disease with tubercle, alive or dead, and considers it to be a sign of what he describes as the exudative diathesis, the origin also of infantile eczema. Certain different infections tend to cause an outbreak of the symptoms of this diathesis, measles in particular, and that is why phlyctens are so often observed during or immediately after an attack of this exanthem. The fact that a good many of the children in whom the disease is present will give a positive reaction to tubercle tests is no adequate proof, for reasons sufficiently obvious, that the disease is itself tuberculous; and a number of careful observers have failed to find the bacillus in phlyctens which they have excised. The association, so frequently noticed, of some form of gastro-intestinal upset, and which may often be caused by injudicious feeding, may point to absorption of some toxin or undesirable products from the digestive tract being the exciting cause of the "letting loose" of this exudative tendency, and to the advisability of not neglecting the old-fashioned "Gregory" or similar stomachic in the course of treatment. The natural attempt to get rid of these toxins, according to Lafon, causes discharge from various surfaces, such as phlyctens on the eye and eczema elsewhere. Another view suggested by some successful attempts with bovine tuberculosis is that phlyctenules may be due to infection with that form of tubercle.

DERMATOLOGY.

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TREATMENT OF SOME COMPLICATIONS OF ULCER OF THE LEG.

A METHOD of successfully coping with chronic ulcers of the lower limb was described in the February number of this *Journal*, but there are certain accessory conditions which need attention to obtain thoroughly satisfactory results. These are dealt with in detail by Schäffer (*Beihfte zur med. Klinik*, Heft 5, Urban u. Schwartzenberg, Vienna, 1910). In the main, such are grades of inflammatory dermatitis. In its simplest form this appears as a superficial eczema, which in time passes on to ulceration. In addition to disturbances of circulation and vascular

alterations, there is marked irritability of the skin. The appearances differ in no respect from those of ordinary acute eczema, complicated by the secondary results of scratching. Only soothing measures are admissible. One of the best applications is R. *Acidi borici*, grs. xx.; *Zinci oxidi*; *Bismuthi subnit.*, āā ʒi.; *Ol. ricini*, ʒii.; *Vaselini ad ʒiss.* This is spread on a bandage made of lint and applied *secundem artem* from the toes upwards. Such a dressing is usually well borne, even in the most acute stage. If in exceptional cases it fails to agree, then one with a basis of cold cream and without the boric acid may be substituted, or Lassar's paste thinned down with extra vaseline, and having boric rather than salicylic acid added, to which, if itching is severe, 5 to 10 per cent. of bromocoll may be joined, may be used in the same way.

Should the inflammatory phenomena be remarkably severe, if the pain is intense, and if all previous efforts at treatment have but aggravated the condition, then nothing suits better than 3 grs. of thymol in an ounce of carron oil. When, however, the grade reached is that of a deeper eczematous process with secondary infection, shown as a brawny hardness with some concurrent phlebitis and pustulation, and when with these there are found erosions, if not actual ulceration, in the centre of the most pronounced infiltration, moist dressings are indicated. Watery solutions of resorcin are most valuable, as such act in combating inflammation while being at the same time bactericidal. Commencing with a $1\frac{1}{2}$ per cent. solution, the strength may be gradually increased to 5 per cent. Boric acid may be used conjointly with the resorcin in the proportion of 2 per cent. of each. When the inflammation has been reduced, recourse may be had to appropriate salves.

In the chronic torpid, usually infiltrated, eczema of the leg, constituting the third grade, we proceed to more and more active remedies. Tumenol oil, or the more recently introduced tumenol ammonium, prove eminently serviceable. Ointments, pastes, or thick lotions are all under different circumstances available. On the whole, perhaps, soft ointments are to be preferred. As the state is a chronic one, ample opportunity of trying combinations is afforded. If a large area is involved, the remedy can be tested on a part. We may incorporate the tumenol with Lassar's paste, beginning with 1 per cent. and rising eventually even to 10 per cent. Tumenol has itself an antipruritic influence, but this is augmented by adding 2 to 5 per cent. of bromocoll. We may at times obtain the desired softening effect by employing a zinc-bismuth salve as a basis. R. *Ol. tumenol*; 2·5—5·0 *Zinci oxidi*; *Bismuthi subnit.*, āā 5·0; *Cerati Galeni*, Ung. simp., āā ad 50·0. This tumenol zinc-bismuth ointment, which has proved itself of value in other skin affections, as in anal and genital eczemas, pruriginous eruptions in children, often acts like a charm.

GRAIN ITCH (*Acaro-Dermatitis Urticarioides*).

In late spring of 1901 there appeared in Philadelphia and neighbourhood an unfamiliar eruptive disease, occurring chiefly in household epidemics, whose cause remained obscure. In spring and summer of 1909 it again became prevalent in the same locality. An outbreak among twenty sailors on a private yacht was made the subject of investigation by Schamberg and Goldberger, the former of whom has published the conclusions they arrived at (*Journ. Cut. Dis.*, February 1910, New York). It was found that only those who had slept on some new straw mattresses were affected. The wheat straw in these had come from New Jersey. Straw from these was sifted through a fine flour sieve on to a large glass plate over white paper. Close scrutiny of the siftings under strong electric illumination soon detected some slight motion. The moving particles were touched with a needle moistened in glycerine and transferred to a glass slide. Search with the microscope disclosed the presence of a mite of very minute dimensions. This was identified by Mr. Nathan Banks as closely related to, if not identical with, the *pediculoides ventricosus*. This is parasitic on the larvæ of soft-bodied insects. It acquires considerable economic importance, owing to the fact that the insect hosts are usually grain-destroying parasites. The mite is inimical to the grain insects and therefore favourable to the preservation of the grain. The seasonal prevalence may perhaps be explained thus, that as the warm weather of May comes on, the grain moth in the straw develops from the larval stage, and, acquiring wings, leaves the straw, so depriving the *pediculoides* of their nourishment. The famished mites thereupon attack human beings when brought into contact with them. In the case in question, on exposing the bare arm for an hour between two of the incriminated mattresses, a number of characteristic lesions appeared at the end of sixteen hours. Five of the mites applied to the axilla in a watch-glass produced in the same space of time five characteristic lesions. The eruption consists of wheals, many exhibiting at their summit a central pin-point vesicle, more rarely a pustule. This constitutes the lesion peculiar to the disease, but, instead of pure wheals, the efflorescence may be partly erythematous or papular. The lesions themselves are a rose colour, from the size of a lentil to that of the finger nail, and oedematous like those of ordinary urticaria. Exceptionally the vesicles on the erythemato-urticarial base are of some size, and then chicken-pox may be suspected. The eruption is generally profuse, involving the trunk and limbs. It is usually accompanied by intolerable itching, worst at night and interfering with sleep. The ordinary secondary results from scratching ensue. During the early period of the attack chilliness, sometimes nausea, may be present, or even slight pyrexia. As regards the blood, moderate leucocytosis and

marked eosinophilia were found at the height of the disease. The existence of albumen in the urine was determined in three out of twenty cases examined for it. Unlike the scabies mite, the pediculoides does not burrow into the skin. It is probable that in the process of extracting liquid nourishment from the skin, it synchronously injects an irritating substance which gives rise to the lesions. In treatment it is a comparatively simple task to obtain a cure. Schamberg has found the following ointment specially efficacious, as it not only destroys the mites, but at the same time relieves the cutaneous symptoms. R. Beta naphthol, gr. xxx.; Sulphur. præcip., gr. xl.; Adipis benzoat., $\bar{5}$ i., M. The clothing should be boiled. If the source of infection is a straw mattress, it can be disinfected by exposure in a closed chamber to steam, sulphur fumes, or formaldehyde. Ordinarily, the itching subsides within twelve to thirty-six hours, and the eruption is gone in a week or ten days. If, however, the cause is not recognised and the use of the mattress continued, patients may suffer severely for three to seven weeks, then slowly recover. It would seem that the mite dies after a time and permits spontaneous cure.

THE THERAPEUTIC USE OF REFRIGERATION.

Pusey, one of the earliest experimenters with this method, has recently given a résumé of his and others' experience (*Journ. Cut. Dis.*, July 1910, New York). Carbon dioxide snow, the most readily obtained refrigerating agent, has a freezing-point of 80° C., and converts tissues into solid ice instantly upon contact. It can produce any degree of reaction up to complete destruction in from a few seconds to a few minutes. The pain accompanying it is trivial. The principle underlying its therapeutic use is the production of a relatively deep, sharply-defined inflammatory reaction in living tissue by sudden congelation. Its proportion is capable of perfect regulation. It is followed by an interstitial scar-tissue, with a minimal amount of apparent cicatrisation. Its effect is due to two factors—first, the amount of pressure exerted; second, the duration of the freezing. (1) Pressure. Unless this is sufficient to bring the mass of snow in contact with the skin, no freezing occurs. According to the degree of pressure of varying firmness, freezing to a depth of $\frac{1}{32}$ to $\frac{1}{8}$ of an inch follows. Therefore judgment must be exercised as to the amount of pressure employed in any given case. (2) Duration. This is the most important factor. Momentary freezing produces a slight inflammatory redness. If the freezing is prolonged for not more than five to ten seconds, it will, as a rule, merely give rise to an acute dry dermatitis. If continued for twenty to thirty seconds, there is a very intense inflammatory reaction, usually with the formation of a bulla and succeeded by a certain amount of ultimate sclerosis of the skin, without apparent scarring, though there

remains a permanent whitening of the areas. A minute or more results in the production of a thin dry eschar, separating in two or three weeks, leaving a thin white scar. In all cases the application should be timed with a watch. The less abundant the blood-supply to the part and the younger the patient the greater the reaction, hence care must be taken in the case of young children or of thin-skinned fair women. A part which has previously been exposed to X-rays or radium is extremely sensitive to freezing. The snow is prepared by collecting it from the cylinder in a chamois-leather bag and moulding it in a conical glass by pressure, ramming it down with a rod. The mass should then be pared to the shape and size of the lesion. The surface must be cleansed from scales or crusts. Practically no after-treatment is necessary. Among the diseased conditions in which carbon dioxide snow has proved useful, one of the most prominent is lupus erythematosus. It is well known how capricious and how obstinate this ailment may prove itself. Opinions vary as to the duration of exposure. Pusey aims at producing a stimulating rather than a destructive reaction. As a rule his applications have been from five to fifteen, only occasionally extending to thirty, seconds. In all cases there has been improvement, and usually partial or complete disappearance, followed by thin white scars. The brown stains of chloasma and those of senile lentigo have vanished after applications of ten seconds. Applications of twenty to thirty seconds occasion prompt disappearance of the multiple soft warts of children, and longer freezing serves to disperse the large thick warts which form by the side of the nails. Moles and pigmented naevi yield satisfactorily to this method. In children the duration of exposure is from ten to thirty seconds, in adults a minute or rather more. In flat vascular naevi the results are uncertain, but are much better in the small hypertrophic vascular variety. It is also of great value in senile keratoses and senile warts, and here the freezing should last from forty seconds to a minute.

TREATMENT OF INTERTRIGO IN INFANTS.

The intertriginous eczema affecting the genital regions of infants is a relatively harmless affair when it occurs as the sole manifestation in well-cared-for children. Frequent change of properly-aired napkins and the employment of the ordinary zinc pastes and powders suitable for such a condition serve as a rule to cure. But much more serious are those instances where it is but part of a widespread or general eczema, or when the mother or nurse is careless or ignorant. Attempts have been made to combat the difficulty by using varnishes as traumaticine or collodion, which are resistant to water, but these, when applied, cause pain, and are, in addition, irritating. Those applications which are soluble in water, as zinc jelly or gelanthum cream or lotions,

are too readily washed away to prove of use. Unna (*Monatsh. f. Prakt. Dermat.*, 1st April 1910, Hamburg) describes a combination at once simple and effective. This consists of zinc oxide 50·0, eucerine and gelanthum, each 25·0. (Gelanthum, it may be mentioned, is composed of tragacanth and superheated gelatine, while eucerine is a derivative of wool fat.) This produces a soft snow-white mass, easily spread on the skin, which imparts a pleasant feeling of coolness and soon dries. To render it waterproof, the salve, immediately after being spread on the skin, is dusted with a powder consisting of equal parts of tannic acid and carbonate of magnesia. So employed, there results a dry, firmly-adherent coating, which will admit of several changes of napkins. When it peels off it requires to be renewed. Under its use the eczema intertrigo heals rapidly and comfortably. The same dressing will be found useful in the treatment and prevention of bedsores.

A HINT FOR THE TREATMENT OF INVETERATE PSORIASIS.

Brocq, in course of some criticism and reflections on the etiology of psoriasis (*Ann. de dermat. et de syph.*, March 1910, Paris), observes that the argument is illusory, which consists in stating that psoriasis has no connection with the alimentary regimen, because it can be made to disappear by external applications without putting the patient on any special dietary. The influence of regimen in this disease is probably a distant one, acting but slowly on the skin by modifying the condition of the general system. Suitable local measures can cause psoriasis to disappear without modification of the regimen, but the primary cause persists, and so soon as the local medication is suspended the disease recurs. Politzer is right when he says that faults of regimen are not the direct producers of psoriasis, but it is more doubtful if he is correct when he asserts that psoriasis has no connection with regimen; and what proves that this proposition in its absolutism is not exact is the real action which total vegetarianism exerts in the cure of many examples of very intractable psoriasis. One treats a psoriasis locally, yet, notwithstanding all our care, in spite of the strength of our applications it refuses to vanish. Sometimes even the most energetic remedies—oil of cade, pyrogallie acid, chrysarobin, &c.—are not tolerated. If, in such circumstances, the patient is put on a purely vegetarian diet, it is seen that, in the majority of cases, the eruption fades under the influence of the same medicaments which had formerly proved ineffectual, or had set up inflammatory reactions. The fact is indisputable, whatever the explanation.

NEW BOOKS AND NEW EDITIONS.

Pulmonary Tuberculosis and its Complications. By SHERMAN BONNEY, A.M., M.D. Second Edition, thoroughly Revised. Pp. viii. + 955. London: W. B. Saunders Company. 1910. Price 30s.

DR. BONNEY has to some extent done himself an injustice, first in his title, and second in his preface. In his preface he disclaims any desire to be encyclopædic, and laments the omissions which are necessary in dealing with so large a subject. From the title we expected to find him dealing almost exclusively with pulmonary phthisis, whereas in reality he gives generous space to almost every variety of tuberculosis, and although these are treated of as "complications" of phthisis, the book becomes thereby a compendious treatise on tuberculosis in general, and, *pace* the author, quite as encyclopædic as any ordinary reader could desire. Practically all the aspects of the tuberculosis problem are touched on in the 106 chapters into which the book is divided. The information given is well up to date, and is in accord with the latest work on the subject, so that it offers little ground for criticism, and we have only space to allude to one or two points. Dr. Bonney accepts the English and American view as to the relation of human and bovine tuberculosis, and consequently, we are glad to note, he appreciates the risks of infection by the alimentary tract, and does not, as some authorities on phthisis seem disposed to do, regard inhalation infection as by far outweighing all others in frequency and importance. Before discussing the diagnosis of phthisis, Dr. Bonney goes at considerable length into the general physical diagnosis of the lungs. Altogether 60 pages are devoted to matter which can be found in any manual of physical diagnosis, and the volume might have been shortened to this extent without detriment. We are glad to note that he lays greater stress on the diagnostic importance of clicking rales as an early sign of pulmonary mischief than on minute alterations of resonance, &c. The value of X-ray diagnosis is fully recognised, and a good illustrative series of skiagrams is given. Of the tuberculin reactions, it is held that in doubtful cases the negative results are more important than the positive. In discussing the complications of phthisis, separate chapters are given to tubercular peritonitis, tuberculosis of the mesenteric glands, and intestinal tuberculosis. In a future edition we would suggest these might, with advantage, be treated of together under the general head Abdominal Tuberculosis, for in practice it is often impossible to differentiate between them either clinically or in the post-mortem

room. Nearly a third of the book is devoted to treatment in the broadest sense. The social relations of the consumptive, the instruction of the public, the administrative control of tuberculosis, the scope of sanatoria, climate, &c., are all considered. The author is much less sanguine as to the value of vaccines than most other writers. In concluding, we have only to say that the volume is an important contribution to the literature of an important subject. It is clearly written, and, so far as can be seen, without personal bias. The case records introduced to enforce the author's arguments are well selected and serve to add to the interest of the book.

Emergencies of General Practice. By PERCY SARGENT, M.B., B.C. (Cantab.), F.R.C.S., and ALFRED E. RUSSELL, M.D., B.S. (Lond.), F.R.C.P. Pp. 364. 91 Illustrations. London: Henry Frowde and Hodder & Stoughton. 1910. Price 15s. net.

THIS volume is valuable and important from the clinical standpoint. It is not a compilation, but it is the outcome of personal experience—the personal experience of able and broad-minded men, the joint production of a physician and a surgeon—consequently the discussion of conditions which involve operation is free from suspicion of bias. The book is not a systematic treatise, but the various emergencies are considered in relation to possible difficulties and complications—difficulties in diagnosis as well as in treatment. The chapter on the Eye is by a specialist, and those on Anæsthetics and the Ear have been written in conjunction with specialists. In surgical emergencies the authors have wisely refrained from entering into details of ordinary surgical technique. In a few diseases treatment is not limited to that of the emergency (as, for example, skin-grafting after burns is described), but generally it is on the emergency that attention is concentrated. In considering such a large variety of emergencies, medical and surgical, there is room for diversity of opinion. In discussing operation for hæmatemesis it is stated, "If the bleeding point has been secured, we are of opinion that gastro-enterostomy should not be performed at the same time." As the gastro-enterostomy is in most cases the most important part of the treatment, it would have been prudent to guard the foregoing recommendation by reference to the condition of the patient under treatment. For fracture of the clavicle Sayre's method is advised. Doubtless many readers would be pleased had Sayre's method been described. In emergency, the materials for Ellis's method are more likely to be at hand in any ordinary household. In the treatment of sprains and dislocations no mention is made of elastic pressure by means of abundance of wadding and a domett bandage. It forms one of the most comfortable and satisfactory methods. Even

in severe dislocations a week is too long a time to allow to elapse before beginning gentle movement and massage. For the removal of a stone from the urethra mention might have been made of the very simple expedient of passing down to the stone the largest bougie which the urethra will admit. In many cases it will be found that the calculus can be made to follow the instrument as it is slowly withdrawn.

For the treatment of catarrhal laryngeal spasm along with other measures ipecacuanha wine is recommended in teaspoonful doses every quarter of an hour. It is much more effective and useful when given in conjunction with antimonial wine and both well diluted with water. So also in the early stages of acute bronchitis small doses of antimonial wine will be found to shorten the dry stage.

Under hernia, in describing the method of taxis, the instructions given are—"The patient lies upon the back with the thighs slightly flexed." There is an important omission. It ought to have been added "with the hips raised on pillows." The pull upon the hernia in consequence of gravitation of the intestines is a very important aid in reduction. This volume is a very valuable addition to clinical literature.

NOTES ON BOOKS.

DR. ROBERT BING'S monograph *Die Bedeutung der Spino-cerebellarem Systeme* (J. F. Bergmann) is a critical and experimental study of the functions of the cerebellum and its tracts. The main conclusions arrived at are that the chief functions of this part of the nervous system are two:—(1) the regulation of the coarser movements of the limbs, and (2) the maintenance of muscle tone. Bing quotes the work of Grainger Stewart and Holmes in support of the statement that hypotonia may coexist with normal reflexes. Bing's experiments lead him to agree with the views of Munk on the functions of the cerebellum. The monograph is a painstaking piece of work; it contains a full bibliography.

SPIROCAL (The Bayer Company, Ltd.).—We have received from the manufacturers a sample of Spirocal, the monoglycolic ester of salicylic acid, a preparation which is intended for external application in the same class of cases as are at present treated by the oil of wintergreen, &c. As compared with other similar preparations, it is odourless; it is also non-irritating. It is soluble in ether, alcohol, and more sparingly in olive oil (1-15). The directions given are that it should be diluted with twice its bulk of rectified spirit, and a teaspoonful of the mixture rubbed into the affected joint, &c., once or twice a day.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES AND NEWS.

The King Edward Memorial.

AMONG the many interests of our late Sovereign his intense practical interest in sickness stands prominently out, and we can conceive of no more suitable tribute to his memory than something which shall keep this in mind. We have here nothing to do with proposals to restore Linlithgow Palace, to renovate Holyrood, or to establish a national library, but proposals for various medical memorials have been put more or less formally before the Committee, and with these we feel at liberty to deal, and to put forward a fresh suggestion.

While cordially sympathising with the movement for the institution of a middle-class hospital, we cannot bring ourselves to see that the institution of such a hospital in Edinburgh could be seriously regarded as a Scottish national memorial. Desirable as it is, its benefits would be chiefly bestowed on the middle classes of Edinburgh.

The claims of pulmonary tuberculosis are advanced with much force and with much forcible argument. No one can deny the needs of the sufferers from this disease, or can fail to recognise the importance of dealing with it. But is it a matter that should be left to the charitable? Is it not rather the duty of the public health authorities to provide at the expense of the community what is necessary for the safety of the community. It is true that King Edward's interest in this particular disease was great, and in the sanatorium which bears his name this interest is commemorated, but there are other forms of tuberculosis which have not attracted the same amount of public attention, though they are responsible for much suffering, for many deaths, and for very many ruined lives. We refer to surgical tuberculosis, and to the deplorable difference in the prognosis of that condition as it affects the children of the poor and the children of the well-to-do.

Tuberculous glands develop in a child of well-to-do parents. He may or may not be operated on, but he is sent to the country; he is kept in the country or at the seaside, it may be for months, it may be for a year or two, and at the end of the time it is in the majority of cases hardly possible to believe that the child has ever been an invalid. How different is the other side of the story. The poor child is admitted

to hospital; he is operated on—he must be operated on; it is his only chance—and after, if he is lucky, two or three weeks at the “convalescent” he is sent home—to the slums—to return in a month or two for another and yet another operation. In even the successful cases a more or less maimed citizen eventually emerges; in too many instances the end is a little grave.

We put forward the suggestion that Scotland should make its memorial to King Edward a seaside hospital on the lines of Berck-sur-Mer, where on the sandy dunes of Normandy the little wrecks of Paris are turned into strong sturdy bairns. Fresh air, sea breezes, and plenty of good food cure the tuberculous little Parisians, and they will do the same for our little ones.

A site should be chosen which is reasonably accessible to all Scotland: it should be on the East Coast, for that is generally admitted to be the most suitable for such cases, and the district which fits these needs best is Fife. It is the cities which will provide the patients, and Fife is readily accessible from all our large cities. On its wind-swept coast there are many suitable sites where a sanatorium could be erected, where the sandy dunes would provide the playground, and the children would get the chance which at present is restricted to the well-to-do. We are, of course, aware that there are one or two small convalescent homes of this description to which a few lucky ones are admitted. But how long are they kept there? The cure of surgical tuberculosis is not a matter of weeks, and until we have an institution like Berck, our tuberculous children do not have the chance of recovery which humanity demands.

We can conceive of no more fitting memorial to King Edward than the establishment of such an institution.

**The Centenary of Dr.
John Brown.**

THE year 1910 marks the centenary of one of Edinburgh's best loved citizens, Dr. John Brown.

It is difficult to believe that one hundred years have passed since he was born—on 22nd September 1810. His sweet benign face, his fine head with its silvery locks, come so easily to the minds of many of us as “unforgettable,” that we find it difficult to express to those who knew him not the charm of his nature, so fresh, so original, with its turns of quaint fun or tender interest. The younger generation hear his name recalled with loving mention of some speech or action, merry joke or story, as he lightened the sad at heart, or drew smiles from the shy and solemn, in his daily rounds. His was a rare spirit—delicate, subtle, full of gentle playfulness and humour, endearing him to old and young, surrounding him with a “genial atmosphere of universal friendship;” all he met on the streets were his friends—dogs, children, and “grown-ups.”

At the age of seventeen he entered on the study of medicine, and was apprenticed to Mr. Syme, then considered the rising star of

surgery in Scotland. Soon after (1829) Mr. Syme founded the "Minto House Surgical Hospital and Dispensary," renting for this purpose the fine old mansion in Argyle Square. The institution, "noble Minto House,"¹ as Dr. John called it, was deservedly popular, and much beneficial work was done there. There, in 1830, occurred the little incidents from which Dr. Brown wove the immortal story of *Rab and his Friends*. Its beauty, its exquisite pathos, we all know—who can read it without a lump in the throat. In 1858 he published it, though he had written it years before "on the quick," and told it "to the strong-brained primitive people" of his native town of Biggar, but, as he describes, with no brilliant result!

With Mr. Syme John Brown became more of a companion than a pupil, and in the *Hore Subsecivæ* will be found a tribute of love and admiration of the master he almost worshipped. After a few years' active work in the little hospital he went to assist Dr. Martin at Chatham, where he showed self-sacrificing devotion during an outbreak of cholera. He returned to Edinburgh in 1833, and took his degree of M.D. and settled into general practice. He was made a Fellow of the Royal College of Physicians of Edinburgh in 1847 and in 1874 the University of Edinburgh conferred on him the title of LL.D.

The same year he received the more national honour of a royal pension of £100 per annum, for distinguished literary eminence. For life assurance work he was highly qualified, and in January 1864 he was appointed to the Medical Officership of the Life Association of Scotland, which post he held during the remainder of his life. In this he was assisted over a considerable period of years by his lifelong friend Dr. Alexander Peddie, whose centenary also took place this year, he having been born on the 3rd June 1810. They were both minister's bairns, met early in life, and when both chose the profession of medicine were linked in close companionship to the end.

Dr. Brown was a most judicious and safe physician, his mind acute and concentrated, his manner tender and sympathetic. As in cases of disease his diagnosis was rapid, so his perception of character was intuitive—hence the life-like sketches we have in the first volume of the *Hore* of our townsmen Dr. Andrew Combe, Dr. John Scott, Mr. Syme, and Sir Robert Christison, which, he said, were "addressed more to myself than to anyone else." Literature had cast her spell over him. His leisure hours were spent in reading and writing, and though there flowed from his pen papers which charmed thousands of the general public, there was nothing written specially on any strictly professional subject. Many of his writings, however, showed his thorough all round knowledge of medicine. He had long desired to write something on what he called the Logic of Medical Practice. After much research he published in 1849 in the *North British Review*

¹ *Recollections of Dr. John Brown*, by Dr. Peddie, p. 10.

the paper entitled "Locke and Sydenham." It was spoken of as "in both style and contents a singularly valuable bit of thinking." Space does not allow of quotations from the paper or from the criticisms on it. He pleaded for the science of healing, perfected by the practice of its art; his nature shrank from the theories, hypotheses, and reckless speculations of the period—what he called "the lust of innovation."

Of other papers, the outcome of medical experience, what "Health Lectures" were ever delivered like his Health "Sermons," or who stood up for "Our Gideon Grays" as he did! With his sympathetic insight into character, his delicacy of perception, his fine intellectual fibre, his strong feelings both of truth and beauty, whatever he wrote, over a wide range of subjects, was full of original thought, "distinct, distinctive, and distinguished."

As "Rab's" surviving friend, "Dr. John" thanks his own special craft for taking to their hearts that great dog and his friends. "When I think," he says, "of that noble head with its look and eye of boundless affection and pluck, simplicity and single-heartedness, I feel what it would be for us, who call ourselves the higher animals, to be in our way as simple, affectionate, and true as that mastiff."

As a relaxation when weary with work, and the brain cannot fasten on a learned treatise or tolerate a novel, we have only to take down from the shelf a volume of Dr. Brown's *Idle Hours*, his *Hore Subsecivæ*, or, as a friend named it, *Brown's Studies*, and refreshment is sure to come, but we must not omit to read the "Preface," the "Introductory," or the footnotes!

The G. M. C.

NOTHING very eventful occurred at the recent session of the General Medical Council, but a good deal of useful work was done. The President's address was, as usual, a model of brevity and lucidity, and omitted nothing of medical importance which has occurred in the past six months. During the session of the Council there was presented to both Houses of Parliament a Blue Book containing a "Report as to the Practice of Medicine and Surgery by Unqualified Persons in the United Kingdom." We have already referred to the origin of this report, and medical men will do well to procure and study it. The cost is 4½d. It contains reports from the medical officers of health all over the country as to the prevalence of unqualified practice in the districts under their charge. Our dominant feeling after reading the report from cover to cover is one of regret that *all* the medical officers of health have not been so diligent in supplying the information for which they were asked as some of them have been. Two questions were asked: 1. Whether the practice of medicine and surgery by unqualified persons is assuming larger proportions. 2. As to the effects produced by such practice on the public health. The answers are very varied. A great many are limited to two words—No; nil—but others

disclose a very different state of matters. One reply is "it has always been very large and could not well be larger." In Bristol "it has assumed large proportions and is probably increasing in extent." In Birmingham "a large amount of such practice exists." In Huddersfield "a large amount of such practice exists." In Sunderland, "increasing at an alarming rate." It is unnecessary to multiply examples: generally speaking, one finds the reports of the larger towns suggest an increase, while the smaller ones do not. All the information from Edinburgh is "Dispensary practice is carried on by students preparing for examination"—a rather unfortunate way of referring to one of the most valuable features of our school. Glasgow reports "an increase in the number of unqualified dentists. Various specialists, several herbalists, street-corner physicians and other kinds of quacks practise." Kilmarnock and Greenock report that a number of their inhabitants are treated by a Glasgow clergyman for cancer and consumption, and one brief line says that "Glasgow 'quacks' send circulars to Paisley." The report is divided into sections, applying to each of the three divisions of the kingdom, and each is prefaced by a memorandum summarising the reports. The English writer devotes a page and a half to the practice of abortionists and the sale of abortifacients, both of which are evidently on the increase in that country, and in some districts are assuming serious dimensions. The Scottish summariser does not specifically refer to this matter, and only one reference to it appears in the reports. Ireland appears to be commendably free from this malpraxis.

We may conclude our reference to the report in the words of the Scottish summariser: "Although the information obtained from these reports is not large, it is confirmatory of information obtained from other sources, and indicate that there is a fair ground for a more detailed inquiry." And we would add that if the medical profession is in earnest in this matter, it must show itself more active in the provision of the information which the Local Government Board asked for.

As is unfortunately usually the case a large portion of the Council's time was occupied with the consideration of disciplinary cases. Unpleasant as many of these are, they are necessary, for the register must be kept clean, and it is really to the credit of the profession that we have so few black sheep.

But cases come before the Council now which no one would ever have dreamt of bringing a few years ago. In one of these a practitioner had his name erased from the register on account of his association with a special hospital which advertised in the public press for paying patients. Fuller particulars of the case will doubtless be found in the weekly medical press, but the moral we would draw is that young practitioners who contemplate any such venture would do well to consult some of their older and more experienced friends before

entering on it. Another case dealt with the signing of a certificate which was technically false, and in connection with it we can only repeat what we have said in connection with other certificate cases, that medical men must be most scrupulous in putting their name to any document which they sign in virtue of their special privilege as registered practitioners.

The Anæsthetics Committee had under consideration a Memorandum and Bill transmitted by the Lord President of the Privy Council, and drew up a report on the Draft Bill. The report was submitted to and approved of by the Council, and ordered to be printed in the minutes.

Clause I. limits the right of administration of general anæsthetics to legally qualified medical practitioners, or to persons acting under their immediate direction and supervision. Dentists are only to be allowed to administer the drugs or substances specified in a schedule. A saving clause makes provision for cases in which there is reason to believe that delay in obtaining the services of a legally qualified medical practitioner would endanger life.

Clause II. prohibits the use of local anæsthetics by unqualified persons, but refers only to the introduction of these substances through any puncture, incision, or breach of surface for that purpose made or produced.

The Committee, while not committing itself to an opinion on points of drafting, recognised that the Bill, as submitted, gave practical effect to the Council's conclusion on the subject which had already been communicated to the Lord President. With regard to Clause I., it was thought desirable that provision should be made whereby a registered dentist should not be prohibited from administering one or other of the scheduled anæsthetics for a legally qualified medical practitioner in connection with an operation, act, or procedure other than dental conducted by such medical practitioner. In connection with Clause II., it was suggested that provision should be made for prohibiting the application or administration by unqualified persons of dangerous anæsthetic drugs to unbroken surfaces.

The Committee suggested that in the first instance nitrous oxide gas should be scheduled, and expressed the opinion that legislation on the lines of the Bill should speedily receive the sanction of Parliament.

Limited Cliniques.

WE learn to our great satisfaction that the regret we expressed last month that Edinburgh had not imitated Glasgow University in taking power in the New Ordinance to impose a limit on the number of students attending any one clinique were wholly superfluous, for the University already has the power referred to. It is almost unnecessary for us to say that we hope it will be exercised as soon as circumstances permit.

LE RHUMATISME TUBERCULEUX.¹

By ALEXIS THOMSON,

Professor of Surgery, University of Edinburgh.

SINCE the general acceptance of the postulates of Koch, it has become traditional to demand that every lesion before being accepted as tuberculous shall comply with the conditions laid down by the great bacteriologist. At the same time, are we not in the habit of regarding as tuberculous any pleurisy that is not proved to be due to some other specific organism? Similarly, when a surgeon receives a report on a specimen of pus that no organisms are to be found, he concludes that the lesion from which it is derived is most likely to be tuberculous. Poncet would have us go a great deal further: he and his pupils of the Lyons School would have us believe that all conditions, but especially those hitherto called rheumatic, which cannot be associated with a specific pathological cause, are really tuberculous. As we first read the text of his book² and glance at the illustrations, we feel the familiar ground of our pathological experience shifting under our feet; we appear to be in a strange land in which pathological terms have lost their familiar significance. The author's main contention is, that in addition to the lesions called tuberculous, in which we find specific histological structures and specific bacilli, there is a more numerous group of lesions in which these two distinguishing features are absent. Our first inclination is to meet this contention with a direct negative; then we begin to waver, for the better we know the author's arguments the less fantastic they appear. Most readers will recall clinical experiences which were not understood at the time of their occurrence, but which assume a new aspect under Poncet's persuasive reasoning, until gradually there is acquired a more tolerant attitude, which will admit that, after all, there may be a great deal of truth in his argument.

Before elaborating this, it would be well to ventilate certain elementary questions in the general pathology of joints. Some morbid appearances have been regarded for so long as necessarily associated with some definite condition or group of lesions that

¹ Being the Inaugural Address at the meeting of the Nottingham Medico-Chirurgical Society, 19th October 1910.

² *Le rhumatisme tuberculeux*, Poncet & Leriche, Paris, 1910.

we can hardly imagine them having any other relationship. *Eburnation of the articular surfaces* is a good example of this; from at least as far back as the classical work of Adams, it has been regarded as pathognomonic of chronic rheumatoid arthritis, or, as we should say, arthritis deformans, and yet every good museum contains one or more specimens in which eburnation of an articular surface is one of the accompaniments of tuberculous arthritis. I venture to show you this one from the Edinburgh University Museum—a tuberculous knee-joint with china-like eburnation of the inner condyle of the femur over an area corresponding to a wedge-sequestrum in the substance of the bone. From the observation of this specimen two important points may be regarded as established: one that eburnation may be due to other causes than rheumatoid arthritis, and, second, its occurrence in tuberculous joints along with caries of other parts of the articular surfaces shows that mechanical polishing by movement of the surfaces on each other is not essential to its production. If, then, we can no longer rely upon eburnation as evidence of rheumatoid arthritis, we must have an open mind regarding the other classical signs of this disease, and must get firmly into our heads that the same pathological effects can be produced in many different ways and by agents which differ widely from one another.

Bony ankylosis of a joint is another good example; it may follow upon suppuration, with destruction of the articular cartilages and projection of granulation tissue from the bone: it can occur, however, without any of these dramatic incidents, and without destruction of tissue. A sero-fibrinous exudation takes place quietly into the joint and peri-articular structures, and is organised into fibrous connective tissue; the cartilages revert into a similar structure, fusing with that in and around the joint; the newly-formed tissue is in turn converted into bone, and a complete osseous ankylosis is the result. This sequence is well illustrated in certain forms of joint infection of urethral origin. We must be cautious, therefore, in drawing conclusions from a joint affection regarding which we know little more than that it results in ankylosis, such, for example, as those in which the vertebrae become welded together by new bone, or that which is so common in museums—"simple" ankylosis of the sacro-iliac joint.

We must also be careful in estimating the pathological significance of hypertrophied *fringes and loose bodies* derived therefrom, including in this group the arborescent lipoma. Is

it not the case that surgeons had so got into the habit of associating them with rheumatoid arthritis that a great effort was required to concede that they were quite as likely to be met with as a result of tuberculous infection of the synovial membrane?

To give Poncet a fair hearing, therefore, we must revise our views of the pathology of the affections of joints, and have it clearly defined that the same morbid effect may be brought about by a number of different pathological causes.

Poncet introduces his argument by quoting Charcot, who drew attention to the frequency of a scrofulous history in the subjects of chronic rheumatism, and the frequency with which they died of pulmonary tuberculosis. He quotes Bonnet, who was the first to observe the transformation of rheumatic arthritis into white swelling, and the frequent occurrence of articular rheumatism in phthisical subjects. Poncet dates his own conversion to a clinical observation made in 1896. The patient was a child, aged 15, who was admitted to the hospital with disease of the lung, of the nature of which there could be no doubt, with suppurating tuberculous disease of the hip, synovitis of the tendon sheaths of the hand, and polyarthritis of the joints of the fingers. A few days after his admission he was seized with what appeared to be acute articular rheumatism in the knees and ankles, and on reflecting on the nature of these, Poncet could not attribute them to anything but the same cause as the other lesions, and he formulated the conclusion that tuberculosis was capable of setting up pseudo-rheumatism. The idea once promulgated has been worked up by his assistants and has been corroborated by others, especially by his colleagues in the Lyons School of Medicine.

When we are attending a person for gonorrhœa, and a joint becomes affected, we naturally regard the joint affection as gonorrhœal; when we are attending a patient known to be the subject of tuberculosis, and he develops a joint lesion, why should we not regard the latter as tuberculous? In support of his contention Poncet cites the occurrence of acute synovitis following the subcutaneous injection of Koch's lymph, and the vigorous reaction of rheumatic joints after the injection of the modern tuberculin. He thinks that tuberculous rheumatism is the result of the action on the tissues of an attenuated tuberculous virus, derived in all probability from an already existing focus in the body, and this may be in the lung, the bronchial or other lymphatic glands, or in the generative organs; he has never seen it follow on tuberculous peritonitis or tuberculosis of the kidney.

The changes excited in the tissues by this attenuated virus are non-specific, that is to say, there are no epithelioid or giant cells and there are no bacilli: the reaction does not differ from that produced by other infections. It may amount merely to congestion, or there may be a small-celled infiltration, with a serous or sero-fibrinous exudate, and, like the commoner forms of inflammation, it may result in adhesions, the formation of fibrous tissue, and the occurrence of ankylosis in the joints. Poncet calls it inflammatory tuberculosis as distinguished from specific tuberculosis.

In the more acute forms of joint lesion there is thickening of the synovial membrane from congestion, œdema, and infiltration. The cartilages are dull, and may show reddish spots, superficial erosions and ulcers, and a good deal of infiltration of the per-articular tissues.

Where there is effusion into the joint—hydrarthrosis—the fluid contains a good deal of fibrin, and clots easily.

The chronic forms are much more frequently met with; in these the dominant feature may be atrophy of the tissues affected, or, on the other hand, it may be new formation of tissue.

I shall not weary you with a description of all the different varieties. The most important of the atrophic variety is the *deforming polyarthritides*. I need only say of this that, both in the clinical photographs and in those showing the X-ray appearances, Poncet seems to be describing what we are accustomed to regard as chronic rheumatism of the joints of the hands and fingers. The same conditions may be met with in the larger joints, and are attended with stiffness and deformity, and it may be softening and curvature of the adjacent portions of the shafts of the bones. He regards this affection occurring in a localised form as the commonest cause of *hallux valgus*, and of *Madelung's deformity*.

One of the best examples of the type with hyperostosis is the dry senile arthritis, commonly known as *morbus coaræ senilis*. Poncet is a good deal taken up with the primary softening of the bone, and curvature leading to the *coaræ vara of arthritis deformans* of the hip, of which the other features—eburnation, lipping, &c.—are too well known to require mention. There is nothing specific of tubercle; this is, however, suggested by the clinical relationships.

The only other common form is what Poncet calls *ankylosing tuberculous rheumatism*. The changes in the joint which precede and lead up to the ankylosis are quite commonplace, and might

be due to any kind of toxin infection. The ankylosis may be between the articular surfaces or may be chiefly peripheral (*external ankylosis, ankylosis eveli*), as is so well seen in the spinal column. *Arthritis* or *spondylitis deformans*, both in man and the lower animals, even in the horse, is boldly assumed to be the result of an attenuated tuberculous intoxication. Poncet goes so far as to say, "If you have a spontaneous ankylosis, one in which the cause is not apparent, you should suspect tubercle."

So much for the morbid anatomy of tuberculous rheumatism. You will observe that it has not got any that is peculiar to itself: all the lesions included under the term may be produced equally well by other disease-producing factors.

If we now turn to the *clinical aspects* of the subject we find these are dealt with under the headings Arthralgia, Acute and Subacute Tuberculous Rheumatism, and Chronic Tuberculous Rheumatism.

1. The *arthralgias* are dull vague pains in the joints, aggravated by movement and by exertion, and specially affect the spine and large joints; they tend to be erratic, moving from one joint to another. They are regarded by Poncet as an *important premonitory symptom of tuberculosis*, and he believes that in young people they are often erroneously diagnosed as growing pains, bone disease, and disease of the hip or spine, and he refers to cases in which a rapid recovery from one or other of these has caused a good deal of surprise.

2. *The Acute or Subacute Forms of Tuberculous Rheumatism.*—In these forms the simulation of acute rheumatism may be very close indeed. There is the sudden onset of pain and swelling in one or more of the large joints, and, naturally, it is often diagnosed as rheumatism. It may last only a few days and disappear without leaving any trace, or may persist for weeks. It may be followed by inflammation of one or other of the serous membranes, and there is no benefit from salicylates. Sometimes the joint lesion disappears at the same time as one of the internal organs shows symptoms of progressive tuberculosis as in the following case:—

A man, aged 50, is diagnosed as having fibroid phthisis, with a large cavity in the right apex. Asked as to his previous health, his mother died of phthisis at 56, and her sister lost a child from tuberculous meningitis. He himself, at the age of 20, was seized with acute articular rheumatism in many joints, which laid him up for three months. Ten years later he had a fresh attack of the

same kind, eleven years later a third attack, less violent; then there were five years of fair health, then suddenly the outbreak of a pulmonary phthisis, and simultaneous disappearance of the joint lesions.

In other cases the joint lesion becomes chronic and terminates either in ankylosis, which is to be regarded as a satisfactory method of cure, or may terminate in an ordinary tuberculous fungus.

3. *Chronic Rheumatism*.—This may commence as such or may follow on repeated attacks of the acute variety. It occurs at all ages, but is more frequent during the second period of life, and many of the victims are already the subject of tuberculosis. The following case from Terrier's clinic is often quoted:—

In April 1907 a young woman was admitted, pale and emaciated; she did not show any trace of a tuberculous lesion in the ordinary sense of the term. Six months before, after an acute onset, she had suffered from *nodular arthritis of the fingers, toes, and ankylosing arthritis of both wrists, elbows, and knees*. The patello-femoral articulations were specially ankylosed. Since then a more virulent affection of the left knee facilitated the diagnosis, and the *evolution of a synovial fungus* necessitated resection of the joint.

Clinically four varieties can be recognised, and each of these may occur alone or they may be all present in the same patient. *A. Deforming Tuberculous Polyarthritis; B. Chronic Polysynovitis; C. The Dry Senile Arthritis; D. The Ankylosing Tuberculous Rheumatism.*

A. Chronic Deforming Polyarthritis.—This is chiefly met with in young people and is not rare in children. There is progressive swelling of the joints, chiefly the small ones of the hands and feet, although all the joints are liable to be affected. There is friction, crepitation, cracking, the joint becomes deformed, and a vicious attitude is assumed. In the case of the hands, the fingers become flexed and inclined to the ulnar side. The clinical phenomena are apparently identical with those which we usually call polyarticular rheumatism or arthritis deformans. There is no certain means of diagnosis between them, but it would appear that in the tuberculous form skiagrams show islands of rarefaction in the ends of the bones.

B. Chronic Polysynovitis.—In this form the effects of the toxin appear chiefly in the synovial membrane, which becomes swollen, and there is an exudation into the joint with or without melon-seed bodies. We should all regard these as tuberculous.

C. *Dry Senile Arthritis*.—This is met with in the hip in old people, is attended with pain and crackings, limitation of movement, and deformity. Apparently there is an exact resemblance to the features in what we are in the habit of calling arthritis deformans.

D. *Ankylosing Tuberculous Rheumatism*.—In contrast to true rheumatism (what the French call *rhumatisme franc*), in which ankylosis almost never occurs, the pseudo-rheumatisms due to tuberculous toxins are very liable to result in ankylosis. This ankylosing variety is associated with the less grave forms of visceral tuberculosis. We have already referred to the striking forms of ankylosis which occur in the spinal column and in the sacro-iliac joint. The ankylosing form may affect several joints and be of comparatively abrupt onset, with sweating and loss of flesh, the affected joints becoming hot and painful and very sensitive, and, as a rule, faulty attitudes are assumed. In other cases the onset is insidious and there is practically no suffering. The following are illustrative cases:—

The patient was a boy, aged 20, without rheumatic antecedents; his mother had died of phthisis. At the age of ten he had acute articular rheumatism affecting all the joints; it lasted a long time and resulted in adduction of the left hip. When he was fourteen he had a fresh attack of generalised articular rheumatism, affecting all the big joints and the spine, and he has suffered ever since. Towards the age of sixteen the acute pain subsided, but the joints ankylosed in deformed attitudes and he could no longer walk. In 1889 he had an abundant hæmoptysis and in 1891 an apical pneumonia.

Another case recorded is also characteristic. A young woman, aged 32, whose father had died of tuberculous laryngitis, and who, although she had buried two husbands at short intervals, each dying of phthisis, yet maintained good health herself until 1897, when she began to suffer from erratic pains in her joints. This went on until 1900, without any benefit from salicylates, and late in the same year she had an acute articular rheumatism in the large joints, which kept her in bed for three months. When she tried to get up it was found that all the joints were ankylosed. M. Vallas resected the elbow and found the bones absolutely fused, the X-rays showing no trace of demarcation between them. The fingers were deformed but the general health was good; at the right apex, however, there was a little friction, and the sero-diagnosis was markedly positive. Poncet regards this case as one of the most typical of ankylosing tuberculous rheumatism.

He particularly insists on the common forms of vertebral ankylosis being tuberculous in origin. He quotes the case, reported by Broker, of a young girl whose cervical spine became rapidly ankylosed, without apparent tuberculous lesion or abscess, and who died shortly afterwards from pulmonary phthisis. He records another, that of a man, who suffered from tuberculous lesions in the lung and kidney for more than twenty years, and who then became the subject of ankylosis in the spine and shoulders.

In the non-articular form of the ankylosing variety, the hip or knee is the joint most often affected. The progress towards ankylosis may be continuous from the first and be completed in one or two months, with immediate relief from the inflammatory symptoms and sufferings. On the other hand there may be times of improvement and then relapses, and, finally, after many months or years, ankylosis.

Having considered tuberculous rheumatism as it affects the joints, the author proceeds to consider the manifestations *in other tissues and organs*.

In the heart we may have an *endocarditis*, with trivial inflammatory changes, which may run an acute course with general infection, or may result in cicatricial changes and sclerosis of the valves. The *pericardial* form is usually dry, and tends to result in complete obliteration of the sac. Poncet thinks it quite possible that *aortitis* and *aortic aneurysm* may be due to tuberculous intoxication, and he thinks the *palpitation and tachycardia* from which tuberculous subjects so frequently suffer may be due to the action of the toxins on the pneumogastric nerves.

Phlebitis and *phlegmasia alba dolens* may also be due to tuberculous intoxication.

Of the lesions of the respiratory system, *pleurisy* is by far the most frequent, and it is here that the author will find the largest number of adherents to his doctrine.

Apart from the well-known tuberculous *meningitis*, there would appear to be a number of meningeal phenomena which are the outcome of tuberculous intoxication. Poncet puts it that we may have all degrees, from a temporary congestion to confluent tuberculous granulations, and clinically we may have all gradations, from an evanescent headache to a fatal coma. When a patient is the subject of a visceral tuberculosis, and grave meningeal phenomena ensue and terminate in coma, the practitioner diagnoses tuberculous meningitis; but if the patient recovers the diagnosis is assumed to have been wrong. Such coma may be due

to œdema from tuberculous intoxication and is quite capable of being recovered from. It is doubtful if Poncet is warranted in proceeding further and concluding that a severe headache should be regarded as a warning symptom of tuberculosis. Still dealing with the nervous system, he believes it very probable that *serous apoplexies* and other cerebral lesions are tuberculous, probably also some forms of *myelitis*, and very probably also *chorœa*. Most observers will agree that a great many forms of neuralgia and of neuritis may be due to a tuberculous intoxication.

The *sciatica* of phthisical subjects is particularly well known. It is quite likely that in some cases of facial neuralgia there is a similar origin. Poncet carries the argument still further, and suggests that an intoxication of the sympathetic nerve may be responsible for the occurrence of Graves's disease.

Among the ocular manifestations, and in addition to the classical tuberculous iritis, it is possible that some forms of conjunctivitis, keratitis, choroiditis, and iritis are due to tuberculous intoxication.

We are all familiar with the painful swellings and indurated nodules that are met with in such organs as the breast and parotid, and for the occurrence of which we are quite unable to account. It goes without saying that Poncet regards these as of tuberculous origin.

Several of Poncet's pupils have been very decided in ascribing to tuberculous intoxication those forms of *fibromatosis of the pyloric portion of the stomach* which so closely simulate cancer. In this connection I may mention that a stomach believed to be cancerous, resected by my colleague, Mr. Caird, was found on microscopical examination to be the seat of giant-celled tuberculosis, which had led to great thickening of the subperitoneal coat.

The affections of the *colon*, which may be included under the somewhat loose term "*colitis*," surely afford a wide field for the enthusiasm of Poncet, seeing the difficulty we have in accounting for them on any other basis. He quotes the following as illustrative cases:—

The patient, a girl aged 15, had on two occasions been laid up with severe pains in her joints, which benefited from salicylates. A few days after the last attack she had violent colic and diarrhœa, with blood and mucus in the stools, and tenderness in the line of the colon. There were as many as twelve motions in the hour. She made a good recovery, but died three months later from tuberculous broncho-pneumonia.

A servant, aged 37, with a consumptive history in the family, complained for some days of violent abdominal pains and severe diarrhoea. It was found that at the age of 20 she had had articular rheumatism. At 30 she had had bronchitis with hæmoptysis, followed by entero-colitis, lasting fifteen days. At the age of 31 she had another abdominal crisis with diarrhoea, lasting two weeks; examination of the chest showed that there was bilateral tuberculosis.

Poncet believes that in these cases the great mobility of the symptoms and the capacity of spontaneous recovery exclude organic lesions such as tuberculous ulceration. He thinks they are pure congestions due to the elimination of toxins by the intestine.

In the *genito-urinary system* there are comparatively few lesions of the type under consideration, but he suggests that *hydrocele*, from the resemblance of the tunica vaginalis to other serous membranes, is probably due in many instances to tuberculous intoxication.

In the *skin*, perhaps, we have the widest field for variety of lesions, which range from the typically tuberculous, such as *lupus*, to the indurated erythema of *Bazin*. Personally, I am convinced of the tuberculous origin of Bazin's disease.

Erythema nodosum, which has for so long been regarded as typically rheumatic, is selected by Poncet as a lesion typically due to tuberculous infection.

Poncet also regards *subcutaneous fibrous nodules* and *rheumatic purpura* as tuberculous. Curiously enough he says nothing about keloid.

In the muscular system, *myalgias* and *fibrous thickening* of tuberculous origin are regarded as common. It is a little difficult to follow Poncet in ascribing all the different forms of *sclerosis of fascia*, such as that of the palmar fascia which we associate with the name of *Dupuytren*, to tuberculous intoxication. He does not go so far as to say that all Dupuytren's contractions are tuberculous, but he believes that most of them are.

Diagnosis and Prognosis.—When face to face with a lesion which is suspected to be rheumatic, an endeavour should be made to discover the cause. The urethra should be examined to exclude gonorrhoea; inquiry should be made into the surroundings and conditions in which the patient lives, his family history, his personal ailments, remembering how prone a person is to forget these. The attitude towards rheumatism should be very much like that towards syphilis in the presence of an affection

of the nervous system. One should watch for the external signs of tubercle in the skin and accessible organs, and make use of laboratory methods. Poncet thinks most of Arloing's sero-reaction. He has had no experience of von Pirquet's test, and has stopped the Calmette eye reaction since he saw it do harm. The inoculation of the guinea-pig is not always convincing and takes a long time.

Treatment.—The general treatment is the same as for tuberculosis in general. As regards climate, the local lesions are often greatly improved by a prolonged stay in a hot country.

There are two great indications: first, to prevent a transition to the fungating type; secondly, to oppose as far as possible the chronicity and ankylosis. In the acute forms absolute rest is essential as long as the pain lasts, and, owing to the tendency to ankylosis, one must be very careful of the position. Rest is not so good for the subacute synovitis; for these, friction, massage, and hydro-therapeutics are most beneficial. Where the joint is full of fluid one may consider puncture. *In the ankylosing form* the limb must be placed in a good position, and *Bier's congestion* and hot air given a fair trial. When ankylosis has occurred *excision* is to be considered, especially in the elbow. If there is double ankylosis at the hip, one may divide the bone below the trochanters. In painful crises, salicylate of soda and antipyrin are of no use. The best is *cryogenine*, and it seems to have the same influence on tuberculous rheumatism as salicylates have on the true variety. *Aspirin* and *hedonal* are also good. *Inunction with guaiacol*, the application of blisters, and the injection of turpentine are sometimes helpful; treatment at baths like Aix is not to be undertaken without careful surveillance. *Cod liver oil* often does more good than baths. Direct exposure of the diseased joints to the sun has given marvellous benefit.

Hollos¹ is an enthusiastic supporter of Poncet's doctrine; he believes that the toxins derived from some hidden focus act chiefly through the nervous system, especially the sympathetic, giving rise to symptoms which are often ascribed to neurasthenia. He has also elaborated the diagnosis and treatment of tuberculous intoxications by means of tuberculin. For purposes of diagnosis he prefers the hypodermic injection to von Pirquet's method, because the dose is more accurate and he wishes to control the quantity which penetrates the skin. With greater experience he is usually able to omit any diagnostic reaction. In the matter

¹ *Les intoxications tuberculeuses*, Masson et Cie., Paris, 1910.

of treatment he is greatly influenced by Spengler's work on the dual origin of tuberculosis and of the necessity of using bovine tuberculin in cases in which the infection is of the human type, and conversely of giving human tuberculin when the infection is of a bovine type. He lays great stress on the necessity of commencing with very minute doses and proceeding with the utmost prudence. More recently he has been using immunising bodies derived from the red cells of the blood; the immunising bodies are extracted from the hæmocytes of blood which has been immunised against the bacillus both of the human and of the bovine types. Put up in a liquid form, they are either injected with a hypodermic needle or they are rubbed through the skin. The latter is to be preferred in children and in the case of persons who live at a distance.

In conclusion, I may say that it has been my object to give a résumé of Poncet's views as nearly as possible in his own words. I have not ventured to offer any decided opinion of my own, because I have not yet had a sufficient opportunity of forming one. I do think, however, the subject is worthy of our most serious consideration, and I am confident that it will receive this at your hands.

CELL LIFE AND THE LIFE CELL IN ANIMAL PHYSIOLOGY.¹

By JOHN STRACHAN, M.D., Dollar.

THE animal body may be regarded as a commonwealth of cells variously grouped or organised into tissues and individually differentiated, in form and function, to the special work with which these are severally entrusted. In every commonwealth the fundamental principle of management must be the well-being of the individual: thus, in the animal body, each cell of every organ, tissue, and other structure must live, in the full sense of the term, before it can be available for any special function. The essentials of life must, therefore, exist in, and be provided to, each and all.

The first and invariable essential in all life is the presence of protoplasm, that mysterious proteid which defies all the efforts of science to explain or to originate. It can, by analysis, be broken up into its elements, and these accurately measured and weighed so that the proportion of each is known; but they cannot be put together again as protoplasm. The vital principle which unites them is something altogether beyond the resources of science—perhaps an electrical state analogous to that which is seen in the mineral world as radium. Protoplasm is the only repository and source of life. It alone has the power to convert dead food into its own vital substance, and it can be generated only by pre-existing protoplasm. Life, however, may exist in protoplasm, for indefinite periods, in a latent or static condition, as in the infusoria and other germs which float as dust in the atmosphere, in the egg, the suspended animation of the drowned, in rigor mortis, &c. But for active and continued animal life it is essential that there be added the dynamic force from chemical change as generated by oxidation of carbon, for which there must be a constant supply of oxygen and carbon. There must also be a sufficient supply of food, converted into living protoplasm, to replace the result of katabolic waste and afford material for growth. Generation must be carried on to provide for growth and continuity of tissue.

I may here cite the familiar example of the amoeba, a simple

¹ Being the Harveian Oration, delivered before the Harveian Society of Edinburgh, 1910.

nucleated mass of protoplasm without structure or organs of any kind, yet which, if placed in a suitable environment, is capable of carrying on an active life, of absorbing oxygen and carbon and combining these into and exhaling carbon dioxide, of absorbing dead nutritive material and converting it into living protoplasm, ejecting that which is unsuitable, and of multiplying and perpetuating itself by fission, the nucleus first dividing, followed by the stroma, into two complete cells, which again divide and subdivide indefinitely. This, and the almost identical white blood corpuscle, may be taken as the type of cell life, and, as differentiated to special function, of the basis of every animal organism.

In the ovum stage the body of man presents much the same conditions of life as does the amoeba, but thereafter segmentation follows a very different course from mere cell division. In the words of Professor Foster: "The ovum is divided into parts or cells, which early show differences from one another, and these differences rapidly increase as development proceeds. Some cells put on certain characters and others other characters, that is to say, the cells undergo histological differentiation, and this takes place in such a way that a number of cells, lying together in a group, become eventually converted into a tissue, and the whole body becomes a collection of such tissues arranged together according to morphological laws, each tissue having a definite structure, its cellular nature being sometimes preserved, sometimes obscured or even lost." . . . "Instead of all the units, as in the amoeba, doing the same things equally well, the units of one tissue are told off, as it were, to do one thing specially well or specially fully, and thus the whole labour of the body is divided among the different tissues." Such, then, may be taken as the commonwealth arrangement of cells in the animal body. As in a great city every particular industry required to provide for the wants of the community is undertaken by a certain trade or profession composed of a specially trained and skilled set of workmen who devote their whole time and energy to that work and no other, so in the animal body every function required for the well-being of the whole is performed by a certain tissue, composed of cells specially differentiated to that particular function. In the body commonwealth, however, specialisation is carried to far greater perfection than in any human community. There it is as if the workman were relieved, not only from every other public duty, but also from seeing to his own personal necessities, so that every

moment of time and every modicum of vital energy would be entirely devoted to the one special work entrusted to him. That this may be so, every required function must be fully provided for, and every individual cell must be kept fully up to a state of vital efficiency.

The tissue cell must live as does the amœba, but it cannot be left to find its own food and to provide for its own vitality. It is, for one thing, a fixture, like a workman chained to his bench, who must be fed and tended where he stands.

The great discovery of Harvey, to commemorate which we are met here to-night, has brought to our knowledge the wonderful scheme of nature by which this general and individual feeding is effected, the vast vascular and capillary system which permeates every organ and every tissue, bringing the nutritive and life-giving fluid within reach of every individual cell in the body.

It is not, however, food in the ordinary sense that has to be supplied to the tissue cell. The amœba is able to absorb dead particles of nutriment and convert it into its own vital substance, but it has nothing else to do than thus to attend to its personal requirements; whereas in the tissue cell the entire vital energy is required for special function. The metabolism, therefore, takes place elsewhere, and the live article is presented ready made, so that neither time nor energy is withdrawn from the vitally important work going on.

The vital principle, and we must infer also the vitalising power, dwells only in protoplasm, which exists nowhere within the lumen of the alimentary canal. The chyme as it leaves the stomach, and the chyle as taken up by the lacteals, is still dead food, macerated, peptonised, emulsified, and sifted out from excremental matter, but showing no sign of life. It is still outside the living body. Not until it has passed the portals of the mesenteric glands, and received the baptism of fibrin, does it manifest that sign of life known as clotting. The fibrin increases in quantity as the chyle passes through the thoracic duct, and with the addition of lymph, as returned from the tissues, and a number of lymph cells from the lymphatic glands, the chyle is fully transformed into living plasma, and, as such, is added to the bloodstream, although in appearance, in composition, and in vital property it is still very far from being blood.

It is important to note here the differential treatment accorded to the fat in the digestive and assimilative process of food trans-

formation. It, indeed, undergoes little or no change beyond being broken up into minute cell-like oil globules, each surrounded by a delicate film of albumen, with the characteristic milky appearance as taken up by the lacteals. Before entering the blood, however, it is saponified by the fixed alkalies, and converted into a clear transparent fluid, which is immediately taken up by the fibrin and the red corpuscles. It enters little, if at all, into tissue formation; but, as adipose tissue, is more or less largely stored in various parts of the body, as in the areolar tissue below the skin, and in masses about the kidneys, heart, &c. It there seems to serve no functional purpose, unless as padding; it has no nerves, but is permeated by small and capillary blood-vessels, thus bringing it into intimate relation with the blood. I may even say here that it can be looked upon only as a reserve store of fuel, to be drawn upon as required to keep up the process of combustion in the body, the full significance of which will appear later.

If it be admitted, as is generally done, that clotting indicates life, and that it is due to the presence of fibrin, as it certainly is, it follows that fibrin is protoplasm; and I suggest that it is here differentiated to the metabolic purpose of vitalising the food and presenting it as lymph, in living form, to the tissue cells.

I further ask you to regard with me the entire fibrin of the blood as an organic entity; not, as in the amoeba, circumscribed within a cell wall, nor, as in the tissues, within many myriads of cell walls, but as a free continuous mass of protoplasm diffused through and living upon, but distinct and capable, by clotting, of separating itself from the nutritive but inert serum of the blood. The serum, as left by the clot, is not living, and it is not, as such, conveyed to the tissues. It is a mere nutritive fluid, providing food for the fibrin as does the hay infusion for the amoeba. Such of it as is taken up by the fibrin is transformed, as in the amoeba, into living protoplasm, which, in the form of lymph, can pass through the capillary walls into the intercellular spaces, and thus bathe the tissue cells in a vital fluid from which they can draw sustenance as required.

So far, then, we may regard the fibrin as the anabolic organ in the body commonwealth with the function to construct, from the nutritive raw material, living protoplasm to replace katabolic waste continually going on. We are, however, far from having exhausted our view of the blood, and far also from having reached the full vitality of the body.

If nutrition were the only function of the blood, food only

would be required to supply its needs, and one heart would be sufficient to carry it to the tissues. But as the amœba cannot carry on active life without chemical change in the oxidation of carbon with resulting dynamic force acting upon its protoplasm, so every cell in the body must be provided with a like dynamic energy before it can live so as to carry on its special function. The required laboratory work must therefore be forthcoming. The necessary chemical agents are primarily oxygen and carbon, the union of which into carbon dioxide is an invariable condition of animal life. In the lower forms this simple oxidation is probably sufficient, but in warm-blooded animals a higher rate of combustion, with more energetic dynamic effect, is required to maintain the conditions of life. This is effected by a more complex chemical action. Instead of simple carbon we have the compound substance, consisting of the maximum of carbon and hydrogen and the minimum of oxygen in the highly combustible hydrocarbon or fat, a constant store of which is arranged for in the body, as already stated. The oxygen is in union with the organo-chemical compound hæmoglobin in the red corpuscles, to which it is supplied in a constant stream from the atmosphere by the wonderful and beautiful scheme of the lungs and pulmonary circulation.

The two elements, carbon and hydrogen, have each a stronger affinity for oxygen than has the hæmoglobin and than they have for one another, with the result that, when brought together, the two chemical compounds, hydrocarbon and oxyhæmoglobin, are broken up with galvanic action, and this, along with the synthetic rearrangement of the elements as carbon dioxide and water, give the maximum of dynamic effect, and at the same time keep up the heat of the body. Upon this double chemical process the dynamic vitality of the whole system immediately and continuously depends. Nutrition may be withheld for long periods, even the biblical forty days, or as long as the reserve store of fat holds out, but oxidation not for five minutes without death ensuing, nor for one minute without dynamic life being arrested. The question to which I now beg to direct your attention is as to where and how this vitally essential oxidation takes place.

It is certain that somewhere oxyhæmoglobin parts with its oxygen, and that this unites with carbon to form carbon dioxide, and with hydrogen to form water, both of which, as by-products, are brought by the venous blood to, and exhaled from, the lungs, the deoxidised hæmoglobin being also carried there for a fresh charge of oxygen.

It seems equally certain that the carbon and hydrogen of this chemical action are supplied by the fat, which apparently exists for no other purpose. It is generally held that the hæmoglobin holds on to its oxygen till the capillaries are reached, and there gives it up to the tissues where oxidation is supposed to take place. This, it seems to me, can, physiologically, only mean that the tissue cells are individually, like the amœba, left to produce their own life, to absorb the hydrocarbon and the oxygen, carry on the chemical rearrangement with resulting galvanic action within their own stroma, and, by virtue of their protoplasmic nature, convert this into dynamic vitality. Apart from the question of differentiated cells being left with this need for self-living power and the limit it would put upon special functional efficiency, would not such individual cell life production limit to an infinitesimal degree the vital stability of the body? Would not the strength of the whole be as that of the individual cell, just as that of a chain is of its individual links? This may seem like the *reductio ad absurdum*, and scarcely respectful to the eminent authorities who hold the opinion in question; but looked at from the point of view of cell life, it seems to me the only reasonable conclusion to be drawn from the premises. Or to take another view, whatever may be said for the production of heat by a general oxidation of waste or effete tissue, I cannot think that dynamic life could be so produced, or could be made to depend upon such a vague and uncertain quantity. In any case the problem is, I think, open to what may prove a more probable solution.

The red corpuscle is, no doubt, a carrier of oxygen, but not as in a box, the lid of which can be kept shut till the capillaries are reached. It is, as already stated, intimately associated, along with the fibrin, with the saponified fat which is added to the blood just before this enters the right heart and is sent to the lungs; and it contains within its stroma about 1 per cent. of the peculiar complex fat lecithin, no doubt absorbed from the plasma and modified by vital action in accordance with the special combustive process required. If transference of the oxygen to the hydrocarbon is a matter of chemical affinity, why should not this take effect when the two are thus brought together? As a matter of fact, carbo-oxidation does then take place. According to Carpenter, "After absorption of oxygen there is a slight formation of carbonic acid," and on the same authority, founding upon the experiments of Magnus, we know that arterial blood contains as much as 20 per

cent. of carbonic acid, with only an additional 5 per cent. in venous blood. So far as we know, it is only in the red corpuscle that the two elements coexist, and it seems reasonable to assume that it is there that union takes place. The red corpuscle, therefore, may be regarded as a minute stove, or rather as a cell differentiated to the special purpose of producing animal heat, but may it not, at the same time and by virtue of the same action, be a battery generating galvanic force, and, in protoplasm, the state of dynamic vitality?

The small amount of stroma contained and the want of a nucleus have been held to reduce the capacity of the red corpuscle to that of a mere carrier of hæmoglobin and oxygen; but may they not rather point to a differentiation and limitation to the one function by reducing individual requirements to a minimum.

In the tissue cell the one personal function, if I may so term it, which cannot be done vicariously is reproduction, without which there could be neither growth nor continuity of tissue. The tissue cell, therefore, while relieved from nutrient and vitalising work, and differentiated in some cases beyond recognition, is left with its nucleus intact, this being the starting-point, and probably the determining factor, in cell division. The red corpuscle, however, or, as I venture to call it, the *life cell*, is relieved even of this duty, reproduction being provided for by a distinct set of mother cells, named by Professor Foster "*Hæmatoblasts*," which carry on their work chiefly in the red marrow of the long bones. There nucleated red cells, of a comparatively large size, are found busily employed in constructing and loading their stroma with hæmoglobin and in throwing off buds of this stroma, so laden, which pass out into the blood-stream as *red corpuscles*, while at the same time carrying on the usual process of cell reproduction by fission, in which the nucleus takes the initiative. This mother cell remains, like the queen bee, permanently within the hive, so to speak, devoting herself solely to maternal duties. The *life cell*, on the other hand, is, like the worker bee, kept short of the power of reproduction, and its entire vital energy concentrated upon the one function of dynamic life production. The product of each cell must, of course, be exceedingly small, but if we consider the countless myriads which crowd and give its colour to the blood, along with the close relation they bear to the fibrin, as seen in the clot, which looks like a last desperate effort to clasp and hold on to its life-giver, we may conceive of the high voltage, if I may apply the term, of dynamic

vitality imparted to the fibrin in its passage through the arteries.

Let us next consider this fibrin mass, thus highly charged by action of the red corpuscles or life cells with dynamic vitality as if with electricity, moving with a continuous flow to and through the capillary system. (The arterial sheath of connective tissue may serve the purpose of insulation, retaining the charge till the point of action in the capillaries is reached.) There the full force of dynamic vitality will pass to the intercellular lymph and thence to the tissue cells. Thus will the tissue cells, instead of being dependent on self-feeding and individually or locally produced vitality, be bathed in a highly vitalised and continuously renovated lymph from which to draw living protoplasm to replace waste, and dynamic life to meet the demands of functional activity.

Supposing the vital principle to be of the nature of electricity, in being instantly transmissible through the whole mass as through the wires of an electric lighting system, the full vital force of the blood will be available at every point, and the life of every healthy cell, tissue, and organ of the body will be at all times and under all circumstances as that of the arterial blood, which is in very truth, as stated in the ancient Jewish dictum, *the life* of the body. Thus will be obviated the risk of vitality being exhausted piecemeal, and of the body dying by inches.

The suggestions which I have here ventured to put before you may be crude in conception and very inadequately supported by special physiological knowledge and argument, but the functions I have ascribed to the fibrin and to the red corpuscle seem to me the necessary complement to the general differentiation of the tissue cells to their own particular functions. This, to be complete, must entail sacrifice of the powers of self-support, and the necessary conditions of life must be otherwise provided.

THE VALUE OF PHYSICAL EXAMINATION IN MENTAL DISEASES.¹

By LEWIS C. BRUCE, M.D., F.R.C.P.,
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It is not so long ago that the general practitioner, when brought into touch with a case of mental disease, regarded the patient as a sufferer from a malady that had no analogy to the diseases with which he was familiar in his daily practice. Nor is this surprising when one considers the extraordinary mental symptoms exhibited by the insane—symptoms which by their very prominence demand prompt treatment, and which distract the attention from the underlying but very evident physical symptoms, which are the real key to the proper understanding of those diseases that are designated as mental. Nor was the general practitioner alone in his error. The specialist saw no explanation for the symptoms which he was called upon to treat beyond the apparently obvious one that the brain was affected. The more scientific and inquiring, therefore, devoted themselves to the cutting of brain sections, and endeavoured by means of the microscope to detect changes in the brain cells and nerve fibres which might explain the problem of mental unsoundness. Some of the work so undertaken has been of immense histological and pathological value, and indicated the results of gross and prolonged mental disease, but our knowledge of the causes of mental unsoundness was not markedly advanced. The striking advances, however, which during recent years have marked the progress of knowledge in general medicine, have also had their effect upon our knowledge of insanity, and have suggested to some of us that it is now advisable to make research into the nature of the physical disorders in the insane, and, for the time at least, to regard the mental symptoms as the result not of brain disorder *per se*, but of brain disorder arising from physical causes having their origin in disease or disorder of some of the other bodily organs. I am firmly convinced that no organ of the body becomes diseased *per se*, but that all bodily diseases are due to outward causes, which are preventable if we only knew how to prevent them. We constantly meet with cases which are apparently unexplainable on the above hypothesis, but our ignorance is no excuse

¹ An address to the Forfarshire Medical Association.

for assuming that the disease therefore originated without outward cause.

A case that occurred in my own experience is worth mentioning as an example of the apparently unexplainable.

A young woman, aged 30, was transferred from a large western asylum to Murthly. She was described as a case of chronic delusional insanity, with dangerously impulsive tendencies. She quite acted up to the character which she brought with her. She was morose, sullen, and vicious. She was apparently perfectly conscious of her surroundings; she knew all the nurses, some she tolerated, to others she took a violent antipathy. It was the same with her fellow-patients; hardly a day passed but she assaulted someone, destroyed dishes, or broke windows. The only evidence of false consciousness which I was able to detect was the fact that she had names of her own for all the persons with whom she was brought in contact, regardless of what the real names of these individuals might be. No change was noted in her condition for three years, and then one morning it was reported that she was completely paralysed on the right side of the body, and with this there was complete aphasia. Following upon this seizure she developed an extremely high temperature, running up to 104° F., and this fever, which was remittent in character, lasted for three weeks. She was repeatedly examined, but no cause for the temperature could be ascertained. At the end of the three weeks the paralysis was passing off and the speech was returning. Five weeks after the commencement of the seizure she spoke to me quite clearly and collectedly. She asked where she was, how long she had been at Murthly, and how she had come to Murthly. Further inquiries elicited the fact that her mind was a perfect blank for a period dating from the day of her admission to the western asylum up to the date of her awakening to consciousness after the illness which I have described. She knew no one, she remembered nothing about her behaviour, and she did not know her way about the ward, nor her way to the dining-hall, which she had visited thrice daily for three years. She made an excellent recovery, and has been earning her livelihood for nearly two years. Such a case appears to be unexplainable in the state of our present knowledge, and yet her condition of false consciousness with an entire change of personality had some physical basis, if we had only known where to look for it. The recovery was no less extraordinary; my faith in the physical causation of all mental diseases might have been

weakened by such an experience were it not for the fact that I have seen very similar cases in which the physical cause of the disorder was detected and treated with excellent results, and such an example is the next case which I will lay before you.

A married woman, aged 34, was admitted suffering from delusions of suspicion. She was thin and poorly nourished, and her husband stated that he had noticed a gradual change in her character, which had been gradually progressive for about two years. At first she became irritable, then she exhibited violent temper upon little or no provocation. Later she developed hallucinations of hearing, which led her to suspect the presence of strangers in her house, and finally she became suspicious of her husband, believing that he was attempting to poison her: Upon examination she was quite clear and sensible, answered questions quickly, and expressed her delusions freely. Nothing could be detected physically beyond the symptom of hyperleucocytosis, which is not as a rule present in delusional cases. A week later the nurse reported that the patient had a vaginal discharge. The patient herself then volunteered the statement that she had been delivered of a child two years prior to admission, and that the labour had been an instrumental one. Upon examination she was found to be suffering from a fissure of the cervix about half an inch deep and three-quarters of an inch long. Discharge taken directly from the fissure and inoculated upon blood-agar gave a rich growth of a streptococcus, which we lost on attempting to grow in broth. Her blood-serum, however, strongly agglutinated a very similar streptococcus obtained from a case of confusional mania. The local lesion was treated, and healed in two months, and the patient made a perfect recovery. She remembered everything that had happened prior to and since her admission, but she stated that the period of her existence corresponding to her illness seemed to her to be like a dream. There can be no doubt that in this case there was a condition of mental confusion and altered character almost similar to a state of dual personality. The recovery in this woman was beyond question, as the hyperleucocytosis completely disappeared, and she has shown no symptoms of mental disturbance for more than four years.

I regard an examination of the blood and serum in every case of insanity as a necessary routine part of the physical examination, whether the patient is melancholic or excited. If this observation shows that there is a hyperleucocytosis, a further

searching examination should be made of all the bodily organs and functions, including a bacteriological examination of the faeces. My reasons for making this statement are most easily explained by illustrations.

Some ten years ago a young woman of 20 years of age came under my care suffering from acute mania. The patient presented the symptom of a marked and persistent hyperleucocytosis ranging between 17,000 and 25,000 per c.mm., and repeated examinations yielded no information as to the cause of this symptom. The disease in her case took the form of recurrent attacks of delirious excitement, lasting for two or three weeks, followed by periods of sanity extending from a month to six weeks. There are at least two varieties of mania. There is a variety which I term confusional, characterised by more or less delirious excitement, and a variety which is known as manic-depressive or *folie circulaire* mania, where the excitement may alternate with a period of depression. Manic-depressive insanity occurring in young persons is a disease of unfavourable prognosis, whereas in confusional mania the prognosis is much more hopeful. The blood examination in this case indicated that the disease was of the confusional type, because I found that as each attack passed off the hyperleucocytosis increased and remained high during the intervals of sanity, while immediately prior to the onset of a fresh attack the leucocytosis fell most markedly for one or two days. On the other hand, had the case been one of *folie circulaire*, the leucocytosis would have fallen as the attack of excitement passed off, and would have remained low during the period of convalescence. The fact that no symptoms of depression were noticed did not prove that the case was not one of *folie circulaire*, because in that disease the period of depression may be so short as to escape recognition, or it may be entirely suppressed.

Ten years ago vaccine therapy was unknown, and although the blood-serum of this patient strongly agglutinated a streptococcus, which I had recently obtained from the blood of a case of acute mania, it never occurred to me that cultures of this organism might be used as an injection. Instead, I had recourse to polyvalent antistreptococcus serum. Whenever an attack threatened the patient was put to bed and given 10 c.c. of the serum by the mouth. Whether as the result of this treatment or in spite of it I cannot say, but the patient, after several threatened attacks, which were successfully aborted, made an apparent recovery and was discharged. When discharged, how

ever, she had a marked hyperleucocytosis. For several years I was able to keep this patient under observation, and during these years I never found her with a leucocytosis of less than 17,000 per c.mm. except upon one occasion, when she consulted me regarding her health. Upon this examination I found a high leucocytosis, but the polymorphonuclear cells were below 50 per cent., whereas on all previous examinations the polymorphonuclear cells were round about 70 per cent. .

In common with all observations made upon the contents of antistreptococcus serum, I admit that I have never been able *in vitro* to demonstrate the presence of any bacteriolytic substance whatever, yet in the above-mentioned case I believe that the serum had some effect. The pulse-rate always fell some ten beats per minute within half an hour of the administration of the serum, which also produced a mild hypnotic effect. The same results were noted in several other cases similarly treated.

The symptom of persistent hyperleucocytosis after recovery from confusional mania is a very common one, and in the few cases in which I have been able to examine the blood after their discharge from the asylum, I have found it persist for many months. The explanation of the symptom is probably this. The toxæmia, which is the cause of the disease, persists, just as the toxæmia of rheumatism persists, but the resistive power of the patient is at a sufficiently high level to produce antibodies in excess of the toxin. The leucocytes in some way are actively associated in the production or the efficiency of these antibodies, and their presence in excess is an indication of the resistive power of the patient. This observation further explains those cases of mental disease in which most trivial causes precipitate a relapse. I had under my care some time ago a female patient who was admitted suffering from acute mania. In due time she recovered; her friends insisted upon her immediate discharge, and a day was fixed for their returning to the asylum to remove her. For some reason the friends failed to appear, and the patient was naturally much disappointed. That night she became restless and uneasy; her pulse-rate rose to 120 per minute, and before morning she was again acutely maniacal. The next time she recovered the mere anxiety of waiting and hoping that her friends would arrive at the time appointed was sufficient to induce another relapse. The third time she recovered I determined that she should be sent home without being told that she was to be discharged. The friends arrived and the discharge was satisfactorily managed.

Within three days she was back again with a fourth attack. In this patient I believe that the balance between the toxin and antitoxin was during the intervals of sanity so delicately adjusted that the slightest anxiety immediately lowered her resistive power, so that the toxæmia gained the upper hand and a fresh outbreak of mental symptoms followed. The above is by no means an exceptional case, but it is a striking illustration of how easily in susceptible persons a relapse may be induced.

As a second illustration of the value of an examination of the blood and the intestinal flora in insane persons I give the following:—

A female patient, aged 28, was admitted insane as the result of child-birth. There are at least three varieties of puerperal insanity. The most common are those in which a woman already suffering from the toxæmia which predisposes to attacks of mania has the balance of her resistive power upset by the troubles attendant upon labour. The next in order are those cases in which the uterus becomes accidentally infected by streptococcal, staphylococcal, and other organisms during the process of labour. The third variety, about 10 per cent. of the whole, are those in whom labour precipitates an attack of katatonia. This third variety I do not intend to mention further to-day, but I would add that they are the cases of puerperal insanity which do not recover. The patient I am at present describing was not a katatonic, and the length of time which had elapsed between the date of labour and the onset of the symptoms—about seven weeks in all—pointed to her being one of those persons who prior to labour was already suffering from a toxæmia, and in whom the labour acted as an exciting cause of the mania, by lowering the resistive power. She had no vaginal discharge and no fever, but she had a leucocytosis of 30,000 per c.mm., with a polymorphonuclear percentage of 80. This I considered quite a satisfactory blood-count, indicating as it did considerable resistive power, and the usual treatment adopted in such cases, of rest in bed with a nourishing dietary and vaginal douching, was ordered. At the end of six weeks, however, there was very little physical or mental improvement. Several blood examinations made about this time showed that the leucocytosis was now as low as 12,000 per c.mm., with a polymorphonuclear percentage of about 60. A bacteriological examination of the fæces was then made, and a very curious condition was found to exist. Instead of having an abundant flora of *bacillus coli communis*, her intestinal contents

yielded nothing but a pure growth of streptococci. Her serum, in dilutions up to 1 in 40, strongly agglutinated this organism. Vaccines were prepared from growths made on agar, and injections of 20,000,000 organisms were given every ten days for two months but without any beneficial effect. Her serum, although it contained agglutinin, possessed no bacteriolytic power, and her leucocytosis did not increase. I thought it worth while to immunise a sheep with cultures of this organism with the object of obtaining a specific antiserum. A sheep was accordingly injected with gradually increasing doses of broth cultures of the organism for six weeks. At the end of this time the serum of the sheep was tested but found to contain no bacteriolytic properties and very little agglutinin. It was evident, therefore, that the organism was one which, when grown *in vitro*, rapidly lost its capacity for stimulating the production of antibodies when injected into animals. The only method of procedure in such a case was to make the patient her own laboratory for the production of antibodies, and this was done as follows:—The skin of the flank was carefully cleaned, and 1 c.c. of terebene was injected subcutaneously. Inflammation followed, and an abscess formed, which became cold in about eight days; 1 c.c. of a broth culture of the living organism was then injected into the abscess cavity (I had previously ascertained by injections into rabbits that the organism was not a pus producer); practically no inflammation occurred as the result of this injection. A month later the abscess had absorbed, leaving a small hard nodule. The patient had undoubtedly improved mentally, while physically she had gained 9 lbs. in body weight. Two months after the injection she had practically recovered. Upon examining her serum and mixing it in the proportion of two parts of the serum to one part of the broth culture of the organism, and incubating for four hours, I found that her serum had well-marked bacteriolytic power. She was discharged recovered. A year later she developed symptoms of phthisis, and as a result of secondary infection of the phthisical cavities she again developed mental symptoms. Upon readmission to the asylum, her physical condition was such that I did not consider medical interference justifiable. This method of inducing immunity with non-pyogenic organisms is perfectly safe in practice, and it has this advantage over vaccines, that the organism lives and produces its toxins under natural conditions, which cannot be said of organisms grown in the incubator. The dense wall of leucocytes which bounds the abscess cavity effectually

prevents the escape of any of the organisms into the general circulation. How long the organisms live after injection I cannot say, as after injection I leave the abscess alone for fear of accidental contamination. In one case, however, in which the abscess became very tense, I drew off a small quantity of pus with a syringe a week after injection, and from the material so obtained a pure growth of the streptococcus was grown on agar. I have employed this method of producing immunity in twelve cases, and all showed mental and physical improvement, but only two made satisfactory recoveries. This may be accounted for by the fact that so far I have only used this method of treatment in cases which showed no tendency to recover when treated by ordinary methods.

It is not, however, only in the direction of blood observations that physical examination proves of practical value in the diagnosis and treatment of the insane. There are bodily organs which are of great importance not only in the development of the nervous system but also in its nutrition, and probably no gland is of more importance to the healthy tone of the nervous system than the thyroid. There is ample evidence that disturbances of the function of the thyroid leads to mental disorder altogether apart from the mental changes noted in exophthalmos and myxœdema, and there is, I am certain, abundant matter for most valuable research into these conditions of disordered thyroid secretion in so far as they affect mental health. One interesting and instructive case of this sort came under my notice some years ago. The subject was a young girl who had already been treated upon three previous occasions for mental disease. The symptoms upon her first admission led to the diagnosis of mania. The second attack evidently differed from the first, as the patient was now diagnosed as a case of hysteria, and finally, upon the third admission, she was regarded as a case of *petit mal*. When I first saw the patient the outstanding symptom was the sudden occurrence of what were described to me as attacks of stupor, which lasted for varying periods. Between the attacks she presented no marked mental peculiarities. The first attack of stupor which I saw came on quite suddenly while the girl was at dinner. As the nurse expressed it, she went to sleep with her spoon half-way up to her mouth. This attack lasted for six months, and during that time the patient had to be tended and fed like a child. She responded to pin pricks and faradic current by moving slightly, just as a sleeper would who was annoyed by a fly, but nothing

brought her back to a state of consciousness. None of her reflexes were abolished, but they were not active. Her blood-pressure was between 80 and 90 mm. of mercury. The condition resembled the disease known as narcolepsy, but the past history of the patient and certain of the mental and physical symptoms did not support this diagnosis. It was noted at this time that the thyroid gland was very small, in fact hardly palpable. Six months after the commencement of this attack the stupor or sleep suddenly passed off. The patient said that she had no memory of the past six months, but she remembered sitting at dinner when the attack came on. She remained quite active and well for six weeks, and during this period her thyroid gland was quite palpable. The second attack of stupor or sleep came on like the first during a meal. This attack had been in progress about four weeks when again it was noted that the thyroid gland had markedly diminished in size. It then occurred to me that this was an unusual case of thyroid deficiency. The peculiar symptoms of the attacks from which she suffered differed on the one hand from stupor, and on the other hand from narcolepsy. They looked more like prolonged attacks of sleep, and excessive sleepiness is a common symptom of thyroid deficiency. She was accordingly treated by means of thyroid extract, forty-five grains of the dry extract being given daily for seven days. Upon the sixth day after treatment was commenced, the patient became suddenly conscious, and again had no knowledge of what had happened during the attack. She was kept in bed for a week, and then allowed to move about the ward and do light work. As is very commonly the case in patients treated in this manner, there was subsequently considerable gain in weight and all round physical improvement. For about three months she took five-grain doses of the extract two or three times a week, but after that the drug was entirely discontinued. From that day to this the patient has never had a return of these attacks of prolonged sleep.

Another case illustrates the symptoms which may be present as the result of the excessive use of thyroid medication:—

A young woman, about 25 years of age, developed the symptoms of myxœdema. She was ordered by her physician to take small doses of thyroid extract several times weekly. The treatment produced markedly beneficial results, so much so that the patient came to the conclusion that she could not take too much of a good thing, and she gradually increased the dose of thyroid

extract until she was taking sixty grains daily. This excessive dose produced in her an acute attack of mania. I have frequently seen attacks of mania follow excessive doses of thyroid extract in asylum practice, but this is the first case of mania I have ever seen induced by the patient treating herself with the drug. After the maniacal symptoms had lasted for some months I was asked to see the case and make a blood examination. At this time she presented no symptoms of myxœdema, and she had not been given any thyroid since the commencement of the maniacal symptoms. A few weeks later I again had occasion to examine the patient; she was still maniacal, although much improved, but the most interesting fact was that symptoms of commencing myxœdema were now quite noticeable. She was given five-grain doses of thyroid extract twice weekly, and almost immediately the maniacal symptoms completely disappeared.

I beg to thank you, Mr. Chairman and gentlemen, for the honour you have done me in asking me to give the opening address to your Association, and if I have stimulated your interest in the knowledge of the advance in mental diseases I am amply rewarded.

BACILLUS COLI INFECTION OF THE URINARY TRACT.

By M. DOUGLAS, M.A., M.D.

It is only within recent years that attention has been drawn to the occurrence of infection of the urinary system by the bacillus coli. Since Riebland wrote his paper on "Pregnancy Pyelitis" in 1892, a considerable amount of work has been done on the subject on the Continent and in America, but it is only during the last few years that it has been taken up by writers in this country. We know now how common the condition is, how diverse are its clinical features, and how generally it has been, and still is, overlooked. This is undoubtedly owing to the fact that the general practitioner has not become familiarised with the nature of the infection.

The bacillus coli is a normal inhabitant of the intestine, and is probably essential to digestion in the colon. Under some circumstances it assumes pathogenic properties and manifests wide variations in virulence. The same variations are found in infections of the urinary system.

The bacillus coli occurs accidentally in urines, and is also found in mixed infections, where it is secondary to some other organism. We are dealing here, however, with cases in which it has been found in pure culture in catheter, or at least uncontaminated specimens of urine. Although the exact site of the infection is often difficult to localise, we can arrange the cases into fairly definite classes.

1. *Bacilluria*.—The bacillus coli has been found by many observers in urines where the patients complained of no urinary symptoms. Dudgeon found it in two cases of marked chronic constipation, in four out of twenty cases of appendicitis, and in nine out of forty-five urines of pregnant women, none of whom complained of urinary symptoms. At the Evelina Hospital it was found in six cases out of one hundred and forty-five, in two of which there were no symptoms, in two only febricula, while in the other two the symptoms were severe. It has been found commonly in diarrhoeal diseases of children, in children with thread-worms, and in obstinate cases of incontinence of urine. Briscoe describes a typical case of postural albuminuria in which the bacillus coli was found only during the attacks. Improvement followed treatment of the bacilluria.

Professor Hutchens, of Newcastle, has recently recorded cases which he considers to be of the nature of a bacillus coli septicæmia. In one case of prolonged cystitis, which had resisted all treatment, the bacillus coli was found. Two years previously the patient had suffered from a slight attack of colitis. After attention to the colon by repeated irrigations the cystitis quickly disappeared. In this instance there was a secondary infection in the bladder, but this is not always the case. In many cases of a neurasthenic type the bacillus coli has been found, and treatment directed against it has effected a cure. In many of these there is no pus, and sometimes the urine is quite clear, and the bacillus coli is only discovered on cultural examination. The obvious lesson is that in obscure diseases, and in neurasthenia, the urine should be subjected to a careful examination, and even to cultural tests, or the true nature of the case will be overlooked.

2. *Urethritis*.—An acute infection due to the bacillus coli, simulating gonorrhœa has been recorded by Playm and Laag, but this is the only instance recorded. It has been frequently found in cases of chronic urethritis, and probably the "gouty urethritis," where no evidence of gonococci has been found, is due to the bacillus coli.

3. *Cystitis*.—The bacillus coli has been found in nearly half the cases of cystitis examined, but most frequently along with the urobacillus and staphylococci. In children, cystitis is more commonly due to a pure culture of bacillus coli than to a mixed infection. Occasionally in a mixed infection the urine changes from an ammoniacal condition to a strongly acid, from which a pure bacillus coli culture is obtained. I have seen this happen in an old lady of 91, who had suffered for eighteen months from cystitis following a fracture-dislocation of the spine. She refused to allow the catheter to be passed for several days. She became very constipated, and from a state of fair health and normal temperature she became very ill. Her temperature rose on the fifth day to 100° F. and on the eighth day to 102° F. The urine was strongly acid, and a pure culture of bacillus coli was obtained. Under treatment the acute stage passed off, but three months later a pure culture of bacillus coli was still found.

4. *Infection of Upper Portion of Tract*—(a) *In Children*.—The attack is often very slight, but in a well-marked case there is a sudden onset with rigors, a symptom rarely seen in children. The temperature goes up to 103° or 104° F., with marked daily fluctuations. Restlessness and misery are characteristic. Sometimes

there is suppression of urine at first, later the quantity is increased. If it be protracted the child becomes emaciated, has pronounced sweatings, and enlarged spleen. It is most common in girls, and especially under two years. It has occurred after circumcision in boys. Usually there is a previous history of gastro-intestinal disturbance, fissure or excoriation of anus, worms, perineal injury, chill, or scurvy.

(b) *In Adults*.—It is most common in women, and especially during pregnancy. The right side is more commonly affected. It is most common in pregnancy about the age of 25, and at the fifth month, although possible at any period.

The onset is acute, often with a rigor; sometimes there is a preliminary cystitis. The temperature is usually swinging, but the pulse and temperature are not characteristic. The bowels are very constipated, the tongue thickly furred. There is great thirst, loss of appetite, severe headache, depression, loss of memory and mental perturbation. Meteorism is frequent. Pain is widespread over the affected flank. There is superficial and deep tenderness, and often marked rigidity; spasms pass from the back down to the groin; and McBurney's point and the costo-vertebral angle of affected side are very sensitive to pressure. The pain is sometimes present before the rise of temperature. Dr. James Mackenzie has shown that it is incorrect to speak of pain in the kidney or along the line of the ureter. The kidney is insensitive to pain. What is felt is a viscerosensory reflex; that is, it is muscular and cutaneous hyperalgesia, due to reflex stimulation from the affected area. If the stimulus sent along the sympathetic be great, there is an overflow to neighbouring areas in the spinal cord, and so a wider region of superficial pain. Similarly the rigidity or muscular contraction is a visceromotor reflex. In irritation of the renal pelvis and ureter the spinal nerves reflexly stimulated are from the eleventh thoracic to the second lumbar.

The kidney is enlarged and often palpable. There is a leucocytosis, especially polymorphs, and the red blood corpuscles show the signs of a secondary anemia. When the illness is severe the heart is dilated. Often there is absence of vesicular breathing at the adjacent base of lung.

Varieties are—(1) Mild. (2) Severe. (3) Chronic. *Mild* attacks are often mistaken for "lumbago." They may pass off or become chronic. Severe attacks conform to the description given above. In chronic cases there is malaise, muscular pains, irregular temperature, headaches, and fatigued appearance. Bladder

symptoms are slight or absent. Neurasthenia or hysteria often is diagnosed.

The acute stage passes off, usually in less than a fortnight, but pus is found often weeks or months afterwards. Chronic cases are very difficult to cure. The tubercle bacillus should be looked for, as it is often masked by the more easily found bacillus coli.

THE URINE.—Dysuria and frequency of micturition are often the earliest symptoms. The appearance of the urine varies. Hæmaturia is not common. Usually the urine is light yellow and turbid, with a flocculent deposit of mucus and pus. The bacillus coli may be cultivated from a perfectly clear urine, and in the condition of bacilluria the urine is uniformly turbid with bacilli, and does not clear on filtering. In this case there is no pus, and at most only a few leucocytes. Occasionally there is a "fishy" odour, said to be due to the formation of methylamin. The reaction is usually acid. It is never ammoniacal in a pure bacillus coli infection, as the colon bacillus has not the power of splitting urea. In ordinary culture media the bacillus coli has the power of forming acid, due to the fermentation of sugars in the media. Péré found, however, that in peptone-media, although there was an initial acid formation, at the end of four days it was alkaline. Pilcher found that in some cases in which he catheterised the pelvis of the kidney the reaction was alkaline. In these cases there had probably been some retention of urine in the pelvis of the kidney. This does not happen often in the bladder, where the urine is frequently being removed, and so the medium in which the organism is growing has not time to change to an alkaline reaction. The bacillus coli grows best in alkaline or neutral media, but readily also in acid urine. As most of the other organisms found in the urine cannot grow in acid media, we find them disappearing when the urine becomes acid, and a pure culture of bacillus coli is found.

Albumin is present in large quantities in severe attacks. There is no sugar or bile. Sometimes there is a reducing substance when urotropin has been given.

Microscopically.—Leucocytes and bacilli, extra-cellular, Gram-negative, showing beading and clumping, are seen. The caudate cell of the kidney pelvis may be found, but is difficult to distinguish from altered bladder cells. Casts are found when the kidney substance is affected. The bacillus coli cannot be identified by staining reactions from bacillus proteus, the typhoid bacillus, &c., but requires cultural tests.

The *diagnosis* is made by finding the bacillus coli in the urine and the elimination of other conditions, such as tubercle and stone. Cystoscopic examination and catheterisation of the ureters helps in localising the site affected.

The *differential diagnosis* is made from other conditions of the urinary tract — albuminuria of pregnancy, malaria, influenza, pneumonia, and pleurisy. In children, tuberculous meningitis has been diagnosed as pyelitis, and *vice versa*. The children are frequently drowsy and their eyes deviate. In cerebral cases also there may be a terminal cystitis. Enteric fever has been diagnosed. Acute abdominal conditions are the most common to be confused with bacillus coli infection of the urinary system, appendicitis most frequent of all.

The *prognosis* as to life is good. Hyperacute cases are rare, and even these have been saved by nephrectomy. In pregnancy, abortion may terminate the acute attack. As to duration, the prognosis should be guarded. In many cases the attack is short. Other cases which become chronic are very difficult to treat. In some, however, the bacillus coli is found months afterwards in patients who seem to be little the worse. It seems as if some degree of immunity had been established in these cases.

BACTERIOLOGY.—The bacillus coli is the most frequent organism in genito-urinary infections. It produces a haemolysin and an endotoxin, on the latter of which its pathogenic action probably depends. Its vaccine is moderately toxic, causing severe local irritation and general febrile reaction if the initial dose be large. It resembles bacillus typhosus closely. The chief distinction, pathologically, is that with bacillus coli the diseases are local inflammations, while with bacillus typhosus they are septicæmic.

The opsonic and phagocytic index and the agglutination reaction are too unreliable to be of any use in diagnosis.

MODE OF INFECTION.—This is one of the most interesting aspects of the subject, and the one which has raised the most controversy. There are three routes of infection, which have been advocated by different writers.

I. Ascending Infection.—The most common pathway of ascent is (a) *the ureter*. Bond has shown that it is not necessary for the lower part of a mucous tract to be affected by an ascending inflammation. He has further shown that solid particles can be carried up ducts in the reverse direction of the normal current. He demonstrated this by the use of sterilised indigo granules, which, applied to the lips of the uterus, were found a day or two

later in a pyosalpinx. Indigo particles placed in the rectum were found in a cæcotomy wound three days later, although the bowels had been opened in the interval. Ascending currents are produced more favourably when there is any interference, either continuous or intermittent, with the normal flow along the channel. Barnard contends that there are three great means of protecting the kidneys from bacterial invasion from below: (1) The small lumen of the urinary passages; (2) the complete emptying of cavities and tubes at frequent intervals; and (3) an intermittent flushing from above by a sterile fluid. All these means are circumvented by an obstruction, which dilates the urinary passages and cavities. In this connection it is worth noting that there are three places in the ureter where normally there are slight constrictions, viz. just below the pelvis of the kidney, at the level of the pelvic brim, and at the entrance to the bladder. It is just above these three places, and especially the pelvic brim, that abnormal dilatations are found. Obstruction may be caused by pressure of the growing uterus, by kinking of the ureter when the kidney is movable, or by distortion of the bladder. On the other hand, pressure sufficient to cause dilatation above jeopardises the vitality of the ureter with its delicate vascular anastomosis.

The bacillus coli probably travels along the mucous membrane, like the gonococcus, and not along the urinary passages.

Further considerations in evidence of ascending infection are: the greater frequency in females, in whom the short urethra is more liable to be infected. In the majority of cases the lesion is unilateral, and no other organs are affected. In some instances nephrectomy is followed by immediate cessation of all symptoms of septic poisoning. In other cases one side is affected after the other has improved; and in a case of Wright's the inflammation in each kidney subsided from time to time, only to spring into activity again, seeming to indicate that re-infection took place from below. Often there is a preliminary history of cystitis before pain appears in the flank. Lastly, the evidence of ascending infection is demonstrated by the post-mortem examination of affected kidneys. When a kidney abscess is caused by an embolus, the area is interlobular, and the apex terminates in the intermediate zone and between two pyramids; when the wedge is due to an ascending infection it is intralobular, and the apex passes down into a pyramid. Cases recorded by Sundberg and by Stuart McDonald were of the latter type.

(b) *The lymphatics* constitute another possible pathway, but evidence to prove or disprove this is wanting.

(c) *The Blood-Vessels*.—Another route is by the anastomosing arteries and veins which connect the bladder with the kidney. After excision or ligation of one ureter, the corresponding kidney has become converted into a pyonephrosis in consequence of artificial infection of the bladder. This may be by a true hæmatogenous infection.

II. *Descending Infection*.—Descending or *hæmatogenous infection*, in contradistinction to the ascending or urogenous, was early advocated by French writers. Bacilli can pass through the wall of the alimentary canal and be excreted by the kidney if there is a lesion. This happens in typhoid fever; and the condition of bacilluria following on intestinal diseases is suggestive of a bacillus coli septicæmia. In these cases the condition yields to treatment of the lesion in the alimentary canal.

III. *Trans-peritidal Infection*.—The mucous membrane of the colon must be damaged to allow the organisms to pass freely through the lymphatics and pericolic tissues. The proximity of the ascending colon and the frequency of lesions in the appendix may account, to some extent, for the more common occurrence on the right side.

It is almost certain that infection may take place by all the routes mentioned, but it is very difficult to say by which most commonly. For purposes of treatment, however, all should be borne in mind.

TREATMENT.—In a disease, of which the course varies greatly, and in which there is a tendency to spontaneous cure, it is not safe to lay too much stress on one line of treatment. Many cases get better with little or no attention. During an acute attack the patient should be in bed. In pregnancy pyelitis it has been recommended that the patient should frequently assume the knee-chest posture to relieve the ureter from the pressure of the uterus. Pilcher holds that the pressure of the bladder is more often the cause of obstruction, and prefers a position favouring drainage of the renal pelvis.

Milk diet and plenty of fluid, unless there is a risk of hydræmic plethora, should be given. In mild and in prolonged cases a less strict diet is required. A rich vegetable diet is useful in rendering the urine less acid, and so saving the patient from discomfort.

Bathing of the perineum and vulva should be thorough. Thread-worms should be looked for and treated, and one must not forget that relief from pain by local applications, such as

poultices and opium or belladonna fomentations, often allows the patient to obtain sleep.

Attention to the bowels is most important. Constipation or some intestinal lesion is so often found that one of the first indications is to put the alimentary canal into proper working order. Purgatives and enemata are required, and in some cases irrigation of the colon. Professor Hutchens is trying injections high up into the colon of cultures of Metchnikoff's bacillus.

Almost all the urinary antiseptics have been tried. Urotropin, considered so useful in typhoid bacilluria, has not been so successful in this infection. Alkalies, recommended strongly by Dr. John Thomson, are probably the most useful. With children it is extremely satisfactory. Large doses should be given, even to children. How it acts it is difficult to understand. The reaction of the urine cannot have any effect on the growth of the bacillus. The flushing of the kidney is at any rate beneficial.

Specific Therapy.—1. *Sera* have been found to be worthless by most observers. Dudgeon, however, found sera successful in acute cases. He gave 25 c.c. every day for three days. If it does not by then produce any benefit, it should be abandoned.

2. *Vaccines.*—Emery found that in some acute cases it acted almost like an antitoxin. In chronic cases the general opinion is that it improves the patient's condition, but rarely produces a complete cure. In all cases preparations should be made from the patient's own urinary culture. The initial dose is 10 to 40 millions. Repeat the injection every eight to twelve days, doubling the dose each time, but not raising it above 250 millions. If used for a long period a fresh vaccine should be prepared from time to time.

Operative Treatment.—1. *Douching the kidney pelvis* and washing out with 1 per cent. silver nitrate solution or 25 per cent. argyrol through a ureteral catheter gives excellent results. If there is great retention, the catheter may be left in place for five hours or longer, with repeated washing out of the pelvis of the kidney.

2. *Induction of labour* in pregnancy pyelitis is not often required. If the patient is losing ground, if there is serious damage to one kidney, or if both kidneys are affected, then abortion may readily be tried. The beneficial effects of premature labour in two of our cases were very remarkable.

3. *Nephrotomy* may be required where there is a calculus or

a pyonephrosis. In some cases of profound toxæmia, nephrotomy and drainage, with partial excision of diseased portion, should be tried. The convalescence is prolonged, but the patient is in a better position than if the kidney were excised. If the condition is bilateral, nephrectomy is not to be thought of.

4. *Nephrectomy* is reserved for unilateral hyperacute cases, and has produced very rapid cures.

In the majority of the cases the milder forms of treatment will be sufficient. If the condition does not improve, ureteral catheterisation should be tried, where available. Induction of labour is safe, and cures rapidly. The more severe operative measures will rarely be required.

In conclusion, although we have learned much about the infection in the last few years, many observations have yet to be made. Its importance in obstetric practice is now well recognised. For the surgeon it is important to remember as a disease, which closely simulates many other acute abdominal lesions, but for the general practitioner the condition of bacilluria is of great importance. It is one which is much more frequent than is at present recognised, and a little experience will impress one greatly by the knowledge to be gained by more careful examination of the urine. There is no doubt that the bacillus coli can be found in a clear urine. Its presence in the urine is an indication of an auto-intoxication, which demands the careful attention of the medical man. It has not, so far, been the general custom to submit the urine of neurasthenics and others suffering from obscure diseases to a careful bacteriological examination. The cases which I have seen convince me that we have here a possibility for illimitable investigation, and that in many cases medical men will be directed towards the real source of the disease in cases which at present completely baffle them.

For the preparation of this paper I have to acknowledge my indebtedness to my friends Dr. Napier Burnett and Professor Hutchens of Newcastle, and to Dr. F. I. Dawson of Corbridge, in whose practice most of the cases I have seen occurred.

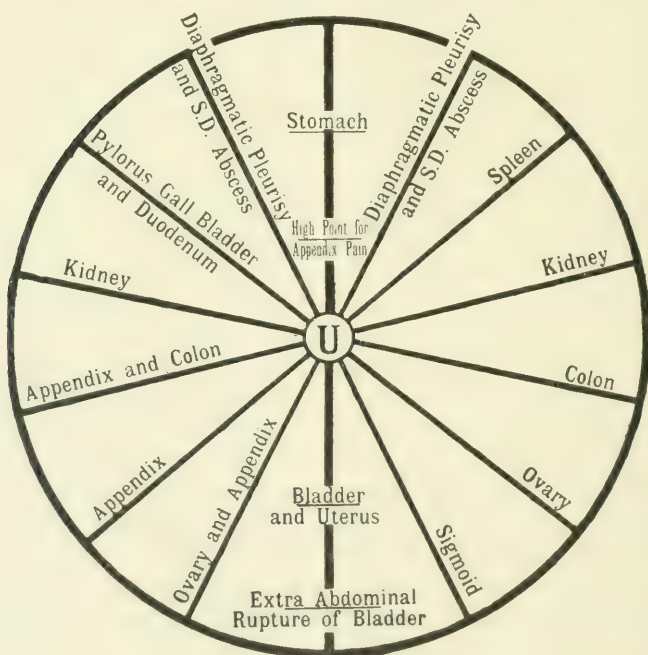
NOTES ON GASTRIC AND DUODENAL SURGERY.

By J. CRAWFORD RENTON, M.D.,

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formerly Examiner in Surgery and Clinical Surgery in the Universities
of Edinburgh and Aberdeen.

ALTHOUGH much has been written on the above subject, a few practical points seem worth mentioning.

Diagnosis.—The abdominal wheel, of which I present a plate,



has been of great assistance in the diagnosis of serious conditions. The umbilicus is taken as the centre of the wheel, and a glance at the figure will indicate the various spokes of the wheel and the value of pain as a localising symptom in those regions. You will note that I have put a high point for appendix pain $1\frac{1}{2}$ inches above the umbilicus. In cases of so-called stomach conditions, when pain is complained of at the above point above the umbilicus,

we must not think of the stomach, but of the appendix, especially when this pain exists alone. When patients present themselves with stomach symptoms a most thorough investigation ought to be made of each case, so that medical treatment may be avoided if there is distinct mechanical obstruction either of the pylorus or in the middle of the stomach, caused frequently by hour-glass contraction. A test breakfast of bread and milk with currants, or preferably raisins, will show in almost complete stenosis currants or raisins returned in the stomach wash at the end of five hours. This establishes the diagnosis of obstruction, and, other things being suitable, surgical interference is absolutely necessary. No currants or raisins being returned, and yet a history of repeated vomiting, will be explained by a careful chemical analysis done by a man of experience. This will save delay in surgical treatment, as, for example, in partial pyloric stenosis, ulceration of the stomach, chronic dilatation in neurasthenic cases, and in malignant disease. Many cases of chronic stomach trouble due to catarrh are cured by judicious lavage and medical treatment, even where operation has been advised; but if the methods mentioned above are attended to, no such mistake should occur.

Regarding malignancy, it is extremely important to remember that rapid loss of weight in a patient above the age of 40, with eructations, and more especially with a rotten-egg odour, is very suggestive of, and in some cases pathognomonic of, malignancy. In such cases, do not delay interference. Long before the above symptoms are reached, a patient whose stomach symptoms are not improving is far better to have an exploratory incision made, and to have the stomach thoroughly examined; until this is recognised generally by the profession, the high mortality in operations for malignant disease of the stomach will not diminish, and as the abdomen can be opened with safety, surely it is unwise to delay a slight operation which may lead to most important benefit in early removal of malignant disease. We cannot too strongly urge upon the profession the importance of the above.

It is often difficult to be positive about hour-glass contraction, but the story of persistent stomach trouble and vomiting from time to time, with a careful analysis, and only a small amount of stomach wash returned, justifies exploration and operation.

A persistent bleeding ulcer of the stomach is far better to be cut out, and, if necessary, a gastro-enterostomy performed. The diagnosis of ruptured gastric ulcer is now so well known to the profession that I need not refer to it, except to emphasise the

importance of distinguishing between it and rupture of the gall-bladder and diaphragmatic pleurisy. In the latter, one generally can make out a little dulness posteriorly with presence of liver dulness, and the detection of a slight amount of friction will save the opening of the abdomen; in gall-bladder rupture the liver dulness is, as a rule, normal. Seeing that the abdomen must be opened in ruptured gastric ulcer, and rupture of the gall-bladder or ruptured duodenal ulcer, it is most important to distinguish a diaphragmatic pleurisy from the other three.

Regarding the diagnosis of duodenal ulcer, such admirable work has already been done by many surgeons on this subject that there seems nothing to add to that, with the exception that if a patient has pain on pressure over the duodenal area, and symptoms of night-hunger and hæmorrhage, it is almost proof positive that there is an ulcer.

CASES ILLUSTRATING THE VALUE OF STOMACH SURGERY.

The following cases, as they illustrate special points varying somewhat from the usual conditions operated on in the stomach, seem worthy of special record:—

J. D., aged 35, sent by Dr. Adamson. He was suffering from attacks of vomiting, occurring at intervals of two or three months, but the raisin test previously referred to did not show any raisins returned. He was advised to continue washing out the stomach when required. Two months afterwards he was seized with a severe attack of tetany, accompanied with vomiting. I agreed with Dr. Adamson that it was now essential to do a gastro-enterostomy, to which he assented. On opening the abdomen the stomach was somewhat dilated, and the pylorus partially stenosed. Gastro-enterostomy was done, and the pylorus was closed with a purse-string suture. This patient made a perfect recovery, and has gained a stone in weight, having had no recurrence of vomiting or any discomfort whatever.

J. C., sent by Dr. Douglas of Cupar-Fife, had a typical hour-glass contraction of the stomach, for which a double gastro-enterostomy was done, with satisfactory results.

R. D. was sent by Dr. Clark of Dumfries. She had been ill for five years, her weight was reduced to five stones, and her condition was one that gave rise to a good deal of anxiety. On opening the abdomen, a decided hour-glass contraction was found,

with stenosis of the pylorus. Double gastro-enterostomy was performed. Now she is quite well, and weighs eight stones.

A. R., aged 37, was sent to me by Dr. Snodgrass: seven years ago I had stitched a ruptured gastric ulcer in her stomach, from which she recovered. For the last six months she had had recurrent attacks of hæmorrhage from the stomach. On operating we found her stomach much contracted in the middle, and the two divisions of the stomach were so small and adherent posteriorly that I did gastro-gastrostomy. She is now quite well. Gastro-gastrostomy is not a common operation, but in a case of this kind it seemed the most suitable to perform.

A. W., aged 40, was sent to me by Professor Stockman, suffering from the symptoms of ruptured gastric ulcer. On operating I found the ulcer in the anterior wall of the stomach and cut it out, stitching the stomach in the usual way. There is no doubt that for solitary gastric ulcer the ideal treatment is cutting the ulcer out when it is so placed as to make this operation satisfactory.

J. L., aged 67, also sent to me by Professor Stockman, walked up to the Infirmary, having been seized by severe pain while in the car going home to his dinner: he came direct to the Infirmary as he was quite sure something serious had happened. His symptoms were not so severe as usual, as he had had no food since his breakfast, but on operating, a ruptured gastric ulcer was found at the pyloric end of the stomach. This was closed and a gastro-enterostomy was done; there being no extravasation of stomach contents into the abdominal cavity, drainage was unnecessary, and the abdominal wound was closed. Kader's operation of gastrostomy we continue to perform, and have pleasure in recommending it.

Operation for Duodenal Ulcers.—J. C., a clerk, sent to me by Professor Stockman, was operated on for duodenal ulcer, from which there had been several hæmorrhages. Gastro-enterostomy was performed, and the pylorus closed by a purse-string suture. There was so much induration around the ulcer that it was unnecessary to stitch it, absolute rest to the duodenum by the closure of the pylorus, which we strongly advise, being sufficient to ensure a satisfactory result. In small ulcers it is well to put blanket stitches through them with a Lembert stitch above, similar to what Mayo has recommended. This case sufficiently illustrates the method we employ. I am indebted to Professor Stockman, Dr. Duff, Dr. Adamson, Dr. Charteris,

Dr. Love, and Dr. Monie for similar cases which have all done well. Patients invariably gain in weight and improve in health if they are careful after this operation. It is important that the patient should for three months take lactate of pepsin and bicarbonate of soda after meals; and, bearing in mind that the stomach has been weakened by the length of the illness, the diet ought to be regulated so as to avoid rich and not easily digested foods.

CLINICAL RECORD.

COMPLETE EXTIRPATION OF PANCREATIC CYST.

By ALEXIS THOMSON, M.D., F.R.C.S.,
Professor of Surgery, University of Edinburgh.

THE patient who is the subject of this report was a man, aged 55, an old soldier and school janitor, who was admitted on the 22nd of January 1910 to the wards in the Royal Infirmary under my care, on the recommendation of Dr. Cuthbert of Inverkeithing.

While in the army he had lived abroad for several years. Four months before admission he was laid up with a prolonged attack of diarrhoea, and while examining his abdomen Dr. Cuthbert discovered a tumour which was looked upon as an enlarged spleen. Since then the lump has given him no trouble, and he only feels it when, on sitting down, the lower edge hitches on the haunch bone.

He is a stout, vigorous man, apparently in good health. The tumour is rounded, about the size of a cocoanut, and projects downwards from beneath the left costal margin as far as the umbilicus. It has a fair range of movement, is quite insensitive, and its dulness is continuous with that of the spleen. He was kept under observation for a period of six weeks both in my own wards and in the medical house, and by everyone who examined him the abdominal tumour was regarded as an enlarged spleen. There were no changes in the blood.

As the tumour was slowly increasing in size it was regarded as probably of a sarcomatous nature, and an exploration was decided upon. This was done on the 8th of March, the abdomen being opened in the middle line. The tumour was found to be cystic in character, in contact with, but quite separate from, the spleen, the descending colon running along its inner border and the outer layer of the descending colon being tightly stretched over it. The peritoneal cavity having been packed off, the cyst was opened and several pints of dirty brownish fluid escaped, together with a large quantity of clotted material of a brown colour and of the consistence of custard pudding. As the cyst wall was a very definite structure, quite unlike that observed in cases of extravasation into the lesser sac, I thought it best to enucleate the cyst entire, and this was accomplished without any great difficulty. The left kidney was found to be flattened out and very adherent to the cyst, and after separation its raw surface bled so freely that it had to be folded on itself by means of sutures. After removal of the cyst the large cavity was drained by a tube

brought out in the left loin, and the extensive gap in the descending mesocolon was closed with sutures.

He made an uneventful recovery, and when shown at the meeting of the Medico-Chirurgical Society on the 25th May 1910 he was in the best of health and quite able for his work.

Microscopical examination of the wall of the cyst showed it to be composed of fibrous tissue. Lying at the most posterior part of the cyst was a solid tumour about the size of a small fist, which on microscopical examination proved to be a cellular tumour of the type of a soft fibroma, the relationship of cells and blood-vessels, however, suggesting that transition in the near future to a spindle-celled sarcoma was not unlikely.

There can be no doubt of the advantage in such a case of extirpation over drainage: the convalescence is much shorter, there is less risk of contamination of the peritoneum, and if there be any tumour growth underlying the cyst it is got rid of at the same time.

OBITUARY.

DR. STIRLING OF PERTH.

FOR more than fifty years there was no more familiar figure in the streets of the Fair City than that of Dr. David Halket Stirling. A native of Strathtay, born on 16th August 1829, he received his school education within the confines of his own county. He afterwards studied for the medical profession in the University of Edinburgh, where he took his degree in 1853. After graduation he acted as House Surgeon to Gray's Hospital at Elgin, and thereafter resumed his medical education abroad, studying both in Paris and Vienna. He returned from these great medical centres in 1855, and at once settled down to practise in Perth. From the first he took a foremost place amongst his medical brethren, and for many years was the leading medical practitioner in Perthshire. He was the acknowledged head of the medical profession, not only in Perthshire but far beyond its confines. He became Surgeon to the Royal Infirmary of Perth in 1868, and held the post until 1884, when he received the appointment of Consulting Surgeon. On his initiative the Hillside Home was founded between thirty and forty years ago, and until the end he manifested the keenest interest in that useful institution. Within recent years he suggested and carried out an extension of the Home, by the establishment of a sanatorium on the slopes of Kinnoull Hill. The extent of the beneficent work carried out in the Home and in the sanatorium may be illustrated by the fact that during last year nearly 300 cases were treated in them. Dr. Stirling, moreover, in

addition to the thorough performance of all his duties, both public and private, found time to contribute original papers of real value to the medical journals, and as late as four years ago published an important contribution on pulmonary tuberculosis.

His energies, however, were so great that even these varied calls upon his time were not sufficient to exhaust them, and if not the sole founder of the City Mission of Perth, he certainly was one of those who took part in its institution, and for fifty years he was Honorary Secretary to the scheme. The respect with which he was regarded in this sphere was shown a few months ago by a ceremony commemorating the completion of fifty years as Honorary Secretary.

By the members of the medical profession in Perthshire and the adjacent counties Dr. Stirling was held in affectionate regard, and when he reached his jubilee as a medical practitioner in 1903 he was presented by the Perthshire Branch of the British Medical Association with his portrait.

Like so many of his fellow-countrymen, Dr. Stirling took the keenest interest in ecclesiastical and political affairs. He had lived during his youth through the bitterness of the "ten years' conflict," and, after the Disruption, was an attached member of the Free Church, to whose fortunes he was loyal, even after it was merged in the larger United Free Church. But to a man with his largeness of heart no creed was entirely alien, and he was in sympathy with every sect of Christianity. He was, in short, as the minister of Kinnoull recently said, "an earnest and devoted student of applied Christianity." When thinking of the good doctor the motto which is found over the gates of two hospitals, one in Berne and another in Edinburgh—*Christo in Pauperibus*—used often to come into my mind. It seems but yesterday (although it is considerably over thirty years ago) that an enthusiastic reference by me to what was then a comparatively new work—*Ecce Homo*—brought from him at once the keen but kindly retort—"Do not forget that there is also the *Ecce Deus*." To the very end he was deeply interested in all theological questions, and his liberal mind found great pleasure in the spirit of greater freedom which has entered during recent years into such discussions.

As might be expected, Dr. Stirling was, in his early days, a member of the Liberal party; but, like so many, he found it impossible to follow Mr. Gladstone in his change of views on the Irish question. During the Parliament of 1885 he threw in his lot with the Unionist party, from whose principles he never swerved till the day of his death. He was the type of man, nevertheless, for whom the trammels of party are often rather galling, seeing that in political affairs, as in theological and scientific questions, he was possessed of a wide and catholic spirit.

Dr. Stirling married a sister of the late Dr. Lauder Lindsay, Physician-Superintendent of the Murray Royal Asylum at Perth.

They had two sons and a daughter. The elder son was associated with Dr. Stirling for several years before his retirement, and is now Senior Surgeon to the Royal Infirmary of Perth. The younger son joined the Public Works Department of the Indian Civil Service, but was cut off in the flower of his youth by acute disease. Miss Stirling was the devoted companion of her father until the end, which came quite peacefully on 14th October 1910. He had thus entered his eighty-second year at the time of his decease.

He has left so many fragrant memories, as well as visible evidences, behind him that he will never be forgotten in his native county; and to anyone in Perth who should ask after our old friend we would simply reply—" *Si monumentum requiris circumspecte.*" G. A. G.

THOMAS F. S. CAVERHILL

Was born at Crichness among the Lammermoors in 1855. There he received his early education, and riding constantly over the hills he acquired that fine seat in the saddle and that love for horses which remained with him throughout his life. His medical education he obtained in Edinburgh, graduating there in 1878. Afterwards he spent six months in Vienna, where—it was the time of the Bosnian War—he learned much about gunshot wounds and Austrian methods of moving the wounded, a knowledge he subsequently turned to good account in modelling the mounted ambulance detachment of the East Lothian and Berwickshire Yeomanry Cavalry, the first attempt of the kind in this country. On returning from Vienna he was resident at various periods in the Royal Maternity Hospital and in the Royal Infirmary under Mr. Chiene and the late Dr. Claud Muirhead, with the latter of whom he remained closely connected when he finally settled down to practise in Edinburgh in 1882. His great knowledge of his work and perfect bedside manner soon enabled him to gather together a large and influential practice. Early in his career he devoted himself to the study of consumption, and he was one of the first to give a whole-hearted adherence to the so-called open-air treatment of this disease. Having come across so many cases of consumption for whom the existing sanatoriums were too expensive, and who he yet felt would benefit enormously by well-regulated treatment at a more moderate cost, he conceived the idea of converting into a sanatorium on these lines a small house in Peeblesshire, called Caverhill, which he, attracted in the first instance doubtless by the name, had leased with other views altogether—views of a week-end retreat for a tired physician and a peaceful old age. There he had a certain measure of success, and many up and down the country have this day cause to bless the memory of Dr. Caverhill for health restored, or at any rate improved, in this sanatorium on the Manor Water.

For a long period of years he served as surgeon in the Lothian and Berwickshire Yeomanry, retiring with the honorary rank of Surgeon-Colonel. During all these years he was a most popular officer, and took the very greatest interest in everything likely to promote the well-being of the regiment.

In addition to these various duties he was, in 1882, appointed Medical Officer of Health to the county of East Lothian, an appointment he only relinquished last year when the office was reorganised on other lines.

He had behind a somewhat stiff manner a most generous heart, and "those who knew him the best loved him the most." Unfortunately, multifarious duties and the worries of practice told upon a constitution never very robust, and after being laid aside from active work for nearly a year he died at his brother's residence near Jedburgh on the 4th of November last. A hillman with all a hillman's love for the hills, the quiet churchyard of Innerwick at the foot of the Lammermoors where we laid him is surely the most fitting resting-place for all that is mortal of Thomas Caverhill. R. E. W.

MEETINGS OF SOCIETIES.

Edinburgh Medico-Chirurgical Society.

THE first meeting of the session was held on 2nd November, Dr. Byrom Bramwell, President, in the chair.

Mr. Cotterill and Dr. Bruce showed a case of acquired hydrocephalus cured by opening the foramen of Magendie. An attack of posterior basic meningitis had been followed by headaches, vomiting, optic neuritis, paralysis, and distension of the brain. Puncture of the right lateral ventricle did no good. Complete recovery followed reopening of the foramen of Magendie. Mr. Cotterill stated that a very large exposure of the field of operation was essential for success.

Mr. Miles showed a man, aged 60, after removal of the Gasserian ganglion for trigeminal neuralgia of over five years' standing. The operation was a modified Hartley-Krause procedure, and was completely successful.

Dr. Boyd showed a patient after cerebro-spinal meningitis, possibly tuberculous. Recovery had followed treatment by lumbar puncture and collargol injections. The latter were very painful, and Dr. Boyd suggested the use of local anæsthesia before giving them.

The President showed an obscure nervous case, possibly an irregular type of peroneal progressive muscular atrophy, and Dr. Rainy (for Dr. Gibson) showed a case of chronic polioencephalitis inferior.

Professor Caird read a paper entitled "Epithelioma of the Tongue: Review of Sixty Hospital Cases."

Mr. Greig read a paper on "Recurrent Enlargement of the Salivary Glands."

Dr. R. Cranston Low read a paper on "Fungus Infections of the Finger Nails," all of which will appear in the *Journal*.

Forfarshire Medical Association.

A MEETING of the Society was held in the School of Medicine, Dundee, on Thursday, 3rd November, at 8.30 P.M., Dr. Pirie in the chair.

Dr. G. F. Whyte showed a boy of 10 years with congenital dislocation of the right patella, with radiogram of both knees. The case was undoubtedly congenital in origin, as the boy had no illness nor injury at or after birth to account for the dislocation. There was no genu valgum, and no flattening nor malformation of the external condyle of the femur, which is the commonest cause of the condition. The dislocation was a complete one to the outer surface of the external condyle. There was present also some atrophy of the muscles of the whole limb, especially of the quadriceps extensor, and also some rotation inwards of the right femur, which Dr. Whyte thought might be the cause of the condition. In a short paper Dr. Whyte gave a résumé of the published cases, and discussed the etiology and treatment which had been adopted in several of these.

Dr. Foggie read notes of a case of pulmonary tuberculosis with huge cavitation of the right lung. When the patient first came under observation the physical signs suggested a pneumothorax of the upper half of the right lung, and an X-ray photograph seemed to support this. There was also even then evidence of tubercular disease in the lower half of the same lung, and also in the left lung. At death, some years later, there was extensive cavitation at the base of the right lung and advancing disease in the other. The post-mortem examination showed the right lung to be merely a bag with thickened pleura, and only a small piece of lung tissue remaining at the extreme base.

Dr. Don read a paper on "Some Operative Procedures about the Knee-Joint." The first method described was that used in the treatment of chronic cases of hydrops. The joint was opened by longitudinal incisions on either side of the patella, and any evident cause, such as loose bodies or redundant synovial fringes, were removed. If either of the causes seemed sufficient to account for the hydrops, the joint was closed without further treatment, but if no evident cause was detected, a thick silk chain was inserted from the upper part of the joint cavity through the muscles of the thigh in front, where its upper end was fixed. This gave good results in two cases.

Where there was knock-knee in addition to internal derangement of the joint from any cause, the joint was opened by a crescentic flap, and the internal condyle sawn off and pushed upwards, as recommended by Ogston. The healing was good, and the results, so far, have been quite satisfactory.

RECENT LITERATURE.

CRITICAL SUMMARIES AND ABSTRACTS.

MEDICINE.

By W. T. RITCHIE, M.D., F.R.C.P.

THE CLINICAL EXAMINATION OF THE HEART BY MEANS OF THE STRING GALVANOMETER.

By the application of the string galvanometer to the clinical study of the heart a new method of investigating the functional activity of the organ is now available. The researches of Einthoven and of those who have adopted his methods of studying the electro-motive changes in the heart have already led to the elucidation of many interesting problems concerning cardiac action in health and in disease.

In considering the subject of electro-cardiography it is necessary to remember that when any point of an excitable tissue is stimulated a change of electric potential is induced. The part which is stimulated, and which is in activity, becomes electro-negative to the parts at rest. Thus that portion of a muscle which is in activity corresponds to the zinc, whilst the remainder of the muscle which is at rest corresponds to the copper plate of a galvanic cell. If electrodes are led off from the active and passive portions of the muscle and connected with a galvanometer, the changes in electric potential accompanying muscular activity—the action currents of the muscle—can be recorded by the instrument. Waller, in 1887, was the first to register the action currents of the human heart. Employing the capillary electrometer, he showed that the action currents of the heart are transmitted from the organ throughout the body, and may be led off from the moist skin surface. The action currents of the heart, however, being extremely small, and their interpretation being attended with considerable difficulty, Einthoven was led to employ the string galvanometer, and it is this instrument, as modified by Einthoven, that is now being generally used in clinical work.

The instrument is constructed on the principle that a moving conductor suspended in a magnetic field at right angles to the lines

of force tends to be deflected to one side or other, according to the direction of the current. The degree of deflection depends upon the strength of the current passing through the fibre, the strength of the magnetic field, and the weight and tension of the fibre. In Einthoven's string galvanometer the currents from the body are led through a fine silvered quartz fibre, stretched between the poles of a powerful electro-magnet. By means of an arc lamp and a system of lenses the shadow of the oscillating fibre, corresponding to each change of electric potential in the heart, can be magnified and projected upon a screen, or registered upon a moving photographic film. In the latter case the record is termed an electro-cardiogram.

The observations are made while the patient is in the recumbent posture, or while he is reclining quietly in a chair, so as to avoid as far as possible all tremor of the somatic muscles which would otherwise

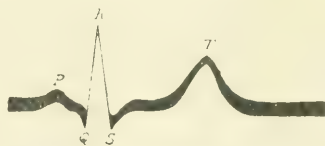


FIG 1.—Diagram of a normal electro-cardiogram.

distort the curve. The currents are led off from the two hands, or from one hand and one foot, immersed in saline solution. The form of the electro-cardiogram differs somewhat according to the parts of the body from which the action currents are led off. Following Einthoven's nomenclature, the right hand and left hand are known as derivation I., the right hand and left foot as derivation II., and the left hand and left foot as derivation III.

A diagram of a normal electro-cardiogram by derivation I. is shown in Fig. 1. The oscillations upon the curve are indicated by the letters *P*, *Q*, *R*, *S*, and *T*. In records obtained by derivation I. each deflection, *P*, *R*, and *T*, upward from the base line indicates that either the base, or right side, of the heart was electro-negative, and therefore in predominant activity, whereas the downward deflections, *Q* and *S*, signify negativity (predominant activity) of the apex, or left side, of the heart.

P is the evidence of auricular activity. During the interval between *P* and *Q*, while the shadow of the galvanometer fibre records a horizontal line, the auricles and ventricles are at rest, and the stimulus which is passing through the auriculo-ventricular bundle to the ventricles is too weak to induce any oscillation of the galvanometer. *Q*, *R*, *S*, and *T* are the deflections resulting from ventricular activity. Their exact interpretation is still a matter of some dubiety. It is supposed that through the Purkinje fibres of the auriculo-ventricular

bundle the stimulus is transmitted to different parts of the ventricular musculature, causing them to contract almost simultaneously, as shown by the oscillations *Q*, *R*, and *S*. *R*, which is one of the most constant of all the oscillations in electro-cardiograms, is held to signify contraction of the basal part of the papillary muscle system. *Q*, which is never large, and indeed often absent from the curve, indicates that the stimulus first influences the apex or left ventricle. *S* likewise indicates a predominance of activity at the apex or left ventricle as compared with the base or right ventricle. The period between *S* and *T*, during which the line of the curve is again horizontal, coincides with the period while the whole mass of ventricular musculature is in contraction, the action currents compensating one another, so that there is no predominance of activity either at base or apex, or of one ventricle over the other. The final oscillation, *T*, is usually an upward one by derivation I. Some observers regard an upward *T* as signifying that the right ventricle remains in contraction longer than the left, while others (Kraus and Nicolai, Gotch) conclude that this upward deflection indicates that the last portion of the ventricular musculature to contract is that near the aorta and pulmonary artery. After the deflection *T* there is again a horizontal line in the electro-cardiogram corresponding to the diastole of the auricles and ventricles.

The Clinical Application and Interpretation of the Electro-Cardiogram.—

Once the string galvanometer is set up and in working order an electro-cardiogram can be obtained both quickly and easily. All that is required of the patient is to sit quietly on the insulated chair and immerse both hands, or one hand and one foot, in jars containing saline solution. The procedure is therefore not more irksome to the patient than that entailed in obtaining graphic records by means of the sphygmograph or clinical polygraph. One great advantage of the string galvanometer over the latter instruments is the elimination of the fallacies dependent upon the inertia of those instruments and upon the delay in the transmission time; but the yet greater value of the galvanometer consists in the fact that by it alone do we obtain information regarding the essential nature of each cardiac contraction.

An electro-cardiogram may differ from the normal (1) in the amplitude and form of the oscillations *P*, *Q*, *R*, *S*, and *T*; (2) in the absence of one or more of these oscillations; or (3) in the appearance of additional oscillations.

The Amplitude and Form of the Oscillations.—In using the string galvanometer it is customary to adopt Einthoven's standard and adjust the instrument so that with a magnification of 800 the shadow of the fibre is deflected 1 cm. by a difference of 1 millivolt applied to it. Einthoven and Samojloff show that in cases of mitral stenosis *P* may be of greater amplitude and of longer duration than normal, and Kraus and Nicolai state that such alterations of *P* indicate auricular hyper-

trophy. R , which is relatively small in children, increases in amplitude in later life, whereas, according to Kraus and Nicolai, S and T are relatively large in children and diminish in size with advancing years. The true clinical significance of the variations in size of Q and S , however, is not fully understood. In health, T is usually a well-marked upward deflection, more or less proportional to the general muscular development of the individual. T may be of normal size and form in cases of well compensated valvular disease. In cases of cardiac enfeeblement, or of myocardial insufficiency, however, T is often merely a small upward deflection, or it may be absent or be even a downward deflection.

Einthoven has shown that in cases of hypertrophy of the left ventricle, R , by derivation III., may be directed downwards, whereas by the same derivation in cases of hypertrophy of the right ventricle R is positive and large.

Ventricular oscillations of anomalous form may be detected in some electro-cardiograms. Such "atypical systoles" are observed in experiments when extra-systoles are induced by direct stimulation of the ventricles. The changes in electric potential and the form of the electro-cardiogram differ from the normal, because the wave of contraction did not pass over the different parts of the ventricular musculature in normal sequence. "Atypical systoles" are often observed in the human electro-cardiogram. As the stimulus spreads through the heart in an abnormal manner, Kraus and Nicolai speak of the event as an allodromia of the heart. By means of the electro-cardiogram extra-systoles can be recognised with greater precision than formerly, and from the form of the curve it is possible to draw some conclusion as to the site of the irritable area in the heart from which an abnormal contraction starts.

Absence of Oscillations Normally Present.—The clinical significance of the absence of Q and S is still uncertain. The significance of an absent or negative T has been referred to already. The absence of all the ventricular oscillations after an auricular deflection P indicates that the auricular contraction is not followed by one of the ventricles. The electro-cardiogram is therefore of value in the diagnosis of heart-block. In cases presenting only a minor degree of impairment of conductivity in the auriculo-ventricular bundle, this defect can be estimated by the duration of the P - Q or P - R intervals. This is a better index of the conductivity of the bundle than any obtainable by mechanical methods of registration, for it obviates the fallacies of an unknown presphygmie period, and of the time elapsing between the opening of the aortic cusps and the appearance of the carotid wave in the neck.

The Presence of Additional Oscillations.—In cases of perpetual arrhythmia of the ventricles the auricular deflection P is absent from the electro-cardiogram. It has long been known that when, in an

experiment, the auricles under faradisation are in fibrillation, the ventricular rhythm becomes markedly irregular. This subject was discussed in this column in June 1909. Since then electro-cardiographic proof has been obtained of the accuracy of the theory, first propounded by Cushny and Edmunds, that perpetual arrhythmia might be due to auricular fibrillation. Rothberger and Winterberg have recorded electro-cardiograms showing that the curves from the human heart in perpetual arrhythmia are similar to those obtained while the auricles under faradisation are in fibrillation. These experimental and clinical researches have been extended by Lewis, who finds that complete irregularity of the human ventricles (as in cardio-sclerosis and in the late stages of mitral disease) and experimental auricular fibrillation are of one and the same nature. In both, the ventricular rhythm is wholly irregular, the venous pulse is of the ventricular form, and the electro-cardiograms are identical. The ventricular oscillations are of the usual type, but the normal auricular deflection *P* is replaced by a series of rapid oscillations superimposed upon the rest of the curve and deforming it. These oscillations are held to be the result of auricular fibrillation.

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SURGERY.

PROXIMAL PERFORATION OF THE INTESTINE IN CASES OF STRANGULATED HERNIA.

IN the *American Journal of Surgery*, October 1910, A. E. Sellenings publishes notes of two cases illustrating an important and rare condition which he terms "Proximal Ulceration of Intestinal Obstruction," previously described by Kocher as "Delmungs-geschwür" (distension ulcer).

Both cases recovered. The first was operated on in 1908 in the service of Dr. Rogers, and the second in August 1910 in the service of Dr. Erdmann. Dr. Rogers's case was an adult female patient with a left-sided inguinal hernia of many years' standing, for which an ill-fitting truss had been worn. On the day of admission the hernia suddenly became irreducible and very painful; some hours elapsed

before her doctor arrived, and, in the meantime, she had been able to reduce the mass. Before the replacement of the hernia she was seized with violent abdominal pain, and after reduction the pain increased and vomiting supervened; the tentative diagnosis was "reduction *en bloc*." On admission to hospital an exploratory abdominal incision showed a moderate amount of sero-purulent fluid and some free feces. In the lower part of the ileum there was a round solitary perforation with well-defined edges about half an inch in diameter; 10 inches lower down the gut was found markedly contused, showing signs of recent strangulation, but quite viable. The perforation was closed but the hernial opening was not touched. For three days following the operation the patient vomited small quantities of greenish fluid at intervals; after that, however, recovery was rapid. The second case was a male, 50 years of age, who had suffered from a right inguinal hernia for two years and had worn a truss. On the day of admission the hernia came down into the scrotum, was painful and tender, and there were colicky pains in the abdomen. The abdominal pains increased in severity, and he was admitted to hospital the same night. His chief complaint was pain in the abdomen, the hernial swelling giving rise to little trouble. There was marked abdominal rigidity, with maximum tenderness in the vicinity of the umbilicus. There was a leucocytosis of 12,000, with 86 per cent. polynuclears, temperature was 102·8° F., pulse 100, and respiration 36. The scrotal swelling was reduced and the abdomen opened, when a quantity of dark brown fluid escaped and a small stream of feces passed from a perforation similar to that described in the last case, the bowel in the vicinity appearing perfectly normal. On examination of the gut there were no signs of recent strangulation as was seen in the first case, indicating that the strangulation had been less severe. The treatment adopted was similar to that described above. A Widal reaction was negative in both cases. Sellenings concludes from the second case that a comparatively slight injury to the intestine may cause a proximal perforation; he then notes that Kocher draws attention to the fact that the common cause of death in all forms of obstruction and strangulation, as well as stricture of the bowel, whether acute or chronic, is not the obstruction or strangulation, but lesions in the intestinal wall above the seat of obstruction. These lesions consist in the formation of circumscribed necrosis of the mucous membrane going on to circumscribed ulceration through the whole thickness of the wall, and giving rise eventually to perforation. The condition is not, as has been described, due to the presence of hard fecal masses, nor is it due to lesions of the mesenteric vessels. Experimental distension of the gut by gas or by fluid will cause venous stasis, which may go on to necrosis of the mucous membrane, and eventually to ulceration and perforation. He quotes the case described by Brewer, in 1889, in which, at a post-

mortem examination after operation for strangulated hernia, a perforation was found 7 inches above the strangulated area. Sellenings thinks that the cases described by him show that distension is not necessarily the essential cause of the condition, and therefore suggests the term "Proximal Ulceration." The practical importance of the condition shows the necessity of examining not only the portion of bowel involved in a strangulated hernia but also of the part above.

GEORGE CHIENE.

INTRA-INTESTINAL HÆMORRHAGE IN WOUNDS OF THE BOWEL.

Serious hæmorrhage into the lumen of the intestine is a rare complication of stab-wounds of the wall. It may arise in two conditions—either the exit of blood into the peritoneal cavity is prevented by blockage of the wound with blood-clot or mucous membrane, or the bleeding takes place from a wound involving only the internal layers of the intestinal wall. The first variety is illustrated by a case recorded by Lenormant (*Progrès médical*, 9th August 1908), in which each of six penetrating wounds of the small intestine was plugged with a clot, and hæmorrhage sufficient to cause death took place into the bowel. Blockage by mucous membrane is more liable to occur in the stomach, in which the junction between the mucous and submucous coats is loose, and the mucosa is exuberant. Two cases of wounds of the internal coats have been put on record, both resulting from a stab with a knife, and both involving the cæcum. The knife penetrated one aspect of the bowel and was carried on far enough to injure the inner layers of the opposite wall from within. In the case recorded by Jalaguier (*Traité de chirurgie*, du Duplay-Reclus, t. vi.), suture of the anterior wound was of no avail, and the patient died of continued hæmorrhage. At the autopsy the incomplete wound of the posterior wall was discovered, but there was no external evidence of its presence. In the other case (Guibé, *La presse médicale*, 7th September 1910) the operator considered the small wound on the external face of the cæcum insufficient to account for the profuse hæmorrhage, and on opening the bowel and washing out the blood he found two scratches on the internal aspect. Each wound was treated, and the patient recovered.

JAS. LOCHHEAD.

RADIO-ULNAR SYNOSTOSIS.

Kienböck describes three cases of radio-ulnar synostosis, and reviews thirty-three others from the literature (*Fortschr. u. d. Gebiet. d. Röntgenstrahlen*, Bd. xv. H. 2). The chief symptom of the condition is the fixation of the forearm in the position of pronation, so that the radial side of the thumb looks backwards or outwards. Rotatory movements are arrested, and flexion and extension may be somewhat restricted,

but are frequently normal. The shaft of the radius is usually abnormally curved, and the head of the bone diminished in size and subluxated forwards or backwards. The atrophy of the radius is marked by a longitudinal furrow on the flexor aspect of the upper third of the forearm. The whole limb is weakened, and the forearm is often noticeably shortened. The extent of the synostosis is from three-quarters to one and a half inches, and as a rule the tuberosity of the radius forms its centre. Gross deformities in the bones and arthritic changes may be present, leading to restricted movements at the elbow, and there may be associated deformities of the hand.

JAS. LOCHHEAD.

LYMPHANGIOPLASTY.

Before the Chirurgical Society of Breslau, Goebel showed a patient treated by Handley's method of lymphatic drainage from the subcutaneous tissues (*Zentralbl. f. Chir.*, 17th September 1910). Following on eczema of the sole of the foot, elephantiasis of the leg had developed ten years previously. In December 1909 four silk threads were introduced from the foot up to the abdominal wall above Poupart's ligament; a slight improvement followed, but it was only temporary. In February 1910 eleven silk threads, made smooth by dipping in liquid paraffin, were inserted. Four of these protruded at one of the scars in the thigh, and were extracted. The other threads still remained in position, and were to be felt under the skin. No improvement, objective or subjective, had taken place. The circumference of the leg was increased at some parts and only slightly diminished at others. Thinking that the failure in this case was due to its long standing, Goebel tried the same procedure in a case of acute elephantiasis in the arm following on mammary cancer. A number of threads were inserted from the hand upwards, but although healing occurred without any reaction, no improvement was effected.

JAS. LOCHHEAD.

SUBCUTANEOUS AND INTRAVENOUS FEEDING WITH GRAPE-SUGAR.

Berendes summarises the results of his experiments in over forty patients (*Zentralbl. f. Chir.*, 10th September 1910). The subcutaneous and intravenous administration of various food substances—cod-liver oil, olive oil, sugar, proteins—has been favourably commented on by many observers, but the method has never come into general use. Berendes found that the introduction of grape-sugar, 5 to 7.5 per cent. in normal saline, was free from danger. When introduced subcutaneously, it took longer to absorb than an equal amount of physiological salt solution, but it caused no more pain. Intravenous infusion was painless; at the most, the patient complained of a feeling of heat in the head, and occasionally of a slight general discomfort. The pulse

gained in strength, and except in two instances the temperature remained unchanged. In both of these an 8 per cent. solution of grape-sugar, containing a few drops of adrenalin, had been used, and its introduction was followed by a rigor and a rise of temperature for several hours. The urine was systematically tested before and after the infusions, and it was found that, provided the amount of sugar introduced did not exceed a certain quantity, none of it was excreted in the urine. The maximum that the body could use up was in general about 50 grm., but it varied with the concentration of the solution, the rate of introduction, the body-weight of the patient, and the degree of inanition. As a rule, a litre of a 5 to 7.5 per cent. solution could be introduced daily without causing glycosuria. Even when this did occur it produced no harmful effects.

JAS. LOCHHEAD.

THE TREATMENT OF CONGENITAL DISLOCATION OF THE HIP.

Experience has amply demonstrated the advantages of the manipulation treatment of congenital dislocation of the hip. If the Lorenz method is adhered to without modification a prolonged treatment is often necessary, after removal of the plaster, to get rid of stiffness or to correct a faulty attitude. For the first three months the limb is fixed abducted to a right angle. After this period it is usual to reduce the abduction of the hip to 45° and to fix the limb again in plaster. At this stage in the treatment, Codet-Boisse (*Gaz. Hebdom. des Sci. Méd.*, 28th August 1910) places the limb, which is abducted to half a right angle, in the position of strong internal rotation.

The X-ray examination of many cases has convinced him that if the abduction is lessened, without rotating the limb inwards, there is a tendency for the head of the femur to be displaced forwards. In these cases a considerable time must elapse before a useful limb can be obtained. In a previous paper Codet-Boisse has published his results in thirty-seven cases of congenital dislocation of the hip.

Twenty cases in which the femur was not rotated inwards yielded eleven functional cures, but in only four cases were the anatomical relations perfect. In a second series of seventeen cases, treated by internal rotation, there was functional cure in fourteen cases, and in all the cases the head of the bone was normally situated.

The case of a child, æt. 4, is quoted to illustrate the rapid return of function with this method of treatment.

The limb was rotated inwards, and the abduction reduced to 45° within two and a half months. The fixed apparatus was discarded after seven months, and massage and faradisation employed. Four weeks after the plaster was removed the movements of the joint were normal and the child could walk without a limp.

JAMES M. GRAHAM.

OBSTETRICS AND GYNÆCOLOGY.

By J. W. BALLANTYNE, M.D., F.R.C.P.,

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HEART DISEASE IN PREGNANCY.

MADemoiselle TER-NICHANiantz (*Rev. méd. de la Suisse Romande*, 30th year, No. 8, p. 679, 1910) discusses the question of the termination of pregnancy in women affected with cardiac disease, and comes to conclusions with which probably we shall not all agree. Some forty years ago the French obstetricians believed that in normal pregnancy there was cardiac hypertrophy, and obstetricians in this country (*e.g.* Angus Macdonald) shared in the belief; but the Germans, whilst admitting the additional work to be done by the heart, thought that hypertrophy was quite exceptional, and were of opinion that dilatation of the right side was to be feared. Since then, what may be called the German view has gained adherents in France. Porak, Letulle, and Pinard have found that hypertrophy is far from constant, and Vinay has come to the conclusion that normal hypertrophy of the heart during pregnancy does not exist, and that when it is met with it indicates the presence of a pathological causal state such as albuminuria or a renal lesion. The writer summarises the present position of the subject thus: Normal pregnancy does not increase the blood-pressure and does not produce hypertrophy of the heart; there is hypertension and hypertrophy only when there co-exists some other disease (especially albuminuria). Pregnancy may be a cause of dilatation, especially of the right side of the heart, but this is a dilatation which is generally without gravity and transitory, and which comes on almost only in women who are tired out by the labour or by numerous pregnancies, or who have also respiratory disorders. Pregnancy does not by itself cause lesions of the myocardium or endocardium, but it may bring to light lesions till then unrecognised. The task imposed by normal pregnancy on the heart consists in driving a larger quantity of blood round the circulation under a normal pressure and in a more developed vascular area. It is only at the time of labour that there is really increased work, but to meet this the heart has a latent reserve force which is usually sufficient. There is, however, during pregnancy marked activity of the pulmonary circulation, due to the presence of more carbonic acid and of toxins in the blood, to the fact that hæmatosis for two beings (mother and foetus) is being carried on, and that the pulmonary area is diminished by the lessening of the thoracic cavity. This increased work is further augmented during the third stage by the rush of blood due to the sudden decompression of the lungs. When, however, the heart is diseased, pregnancy

may have other effects, and gravido-cardiac troubles (as they are called) may arise. According to Mademoiselle Ter-Nichaniantz, statistics seem to show that most women with heart disease pass through pregnancy without trouble, but that when troubles do arise they are often very severe and the mortality high. These troubles do not apparently arise from the single cause of the pregnancy, but are usually related to a morbid state of the myocardium and of the kidneys; so we meet with cases of grave cardiac lesions without unfortunate results and with serious results in cases of trivial valvular lesions. Mitral lesions seem to be the most grave. It is difficult to say how a case is going to go, so much depends on the reserve force of the heart, but if there is compensation and normally acting kidneys the outlook is good, whereas in women who have to work for a living and who have had trouble in previous pregnancies and apart from pregnancy, the prognosis is more grave. When trouble does arise it soon becomes serious, and the mortality for both mother and infant rises. Here, again, the state of the myocardium and the kidneys is of great importance.

The authoress cites Peter's laconic opinion on heart disease and obstetrics: "*Fille, pas de mariage; femme, pas de grossesse; mère, pas d'allaitement.*" With these ideas before her she puts up a strong plea for therapeutic production of abortion, and gives the details of six cases under the care of Professor de Seigneux of Geneva, in five of which prophylactic induction of abortion was performed by the laminaria tent, Hegar's dilators, or the bougie. These cases are made the text of a good deal of special pleading which will appear inconclusive to many; but it must be borne in mind that the authoress is interested particularly in working women. Her conclusion is that the health of the mother who has a family and is of social importance greater than her infant (*viz.* fetal life), is the one thing which should make us decide whether the pregnancy is to be interrupted or not. As a general rule the interruption of pregnancy is to be advised from the beginning, especially in cases of mitral stenosis, for one can never tell when gravido-cardiac troubles will arise, and each pregnancy may weaken the diseased heart and hasten the arrival of the hyposystolic or the asystolic stage. The indication of abortion becomes absolute when premonitory signs of cardiac insufficiency appear, for intervention after the development of the heart troubles themselves is much more dangerous. When pregnancy has advanced beyond the early months intervention becomes a more serious thing, and we may allow the gestation to proceed if there are no heart troubles; but if these arise we must interfere at once and provoke premature labour, for the life of the unborn infant is then very problematical, and the danger to the mother increases suddenly and with every minute.

The above views and opinions have been cited somewhat more fully than is usual in these pages. They are such as are not widely held

in this country, and yet it seems well for us to know that they are advocated so freely on the Continent. Two matters arrest attention: one is the neglect of antenatal life exhibited by the practice recommended, and the other is the absence of reference to consultation with a medical colleague before the performance of the induction of abortion or of premature labour. It may very well be that induction of abortion is a safer operation *for the mother* than the provocation of premature labour, but it ought to be borne in mind that the former is absolutely fatal to foetal existence, whilst the latter gives at least a chance to the unborn infant. Of course it must not be forgotten that Mademoiselle Ter-Nichaniantz is dealing specially with *working* women who are the subjects of heart disease and pregnancy; but surely even for them some other treatment than the induction of abortion can be devised by the medical and obstetrical ingenuity of the twentieth century; in their case the benefits arising from rest and care in a pre-maternity hospital or home are to be desired, and ought to be procurable. Large sums of money are expended annually for less worthy and less important objects than the saving of antenatal life.

Dr. Elmer Sothoron (*Amer. Journ. Obstet.*, vol. lxii. p. 272, 1910) is another writer who takes a grave view of heart disease in pregnancy. He has recorded three cases. One of these was an instance of mitral regurgitation in a multipara, 35 years of age. She had a quick pulse and "sinking spells" during pregnancy, and in labour (which was terminated by forceps) there was dyspnoea, cyanosis, a pulse of 120 per minute and weak. The treatment relied on was strychnine. In the puerperium the same signs of cardiac distress continued, and the pulse ran up to 140, and strychnine, sparteine, and whisky "were used faithfully." After removal to a hospital recovery, although slow, was complete. The second case was one of mitral stenosis in a primipara of 28 years. There was marked dyspnoea at the eighth month, with a rapid, irregular, and weak pulse. Induction of premature labour was advised but not accepted. Suddenly she developed hemiplegia (right-sided), doubtless from an embolism. Three weeks later labour came on, and the delivery of a living child was accomplished by forceps. Eight months later she died of "exhaustion and valvular lesion of the heart." The author believes that the induction of premature labour would have prevented the hemiplegia. The third case was likewise that of a primipara, age 24. She suffered from aortic insufficiency, and had been advised against marriage. From the second month of pregnancy there was periodical loss of cardiac compensation (cough, dyspnoea, rapid pulse). Labour came on at the full term, and was accompanied by a rapid, weak, and irregular pulse of 140. Strychnine, digitalis, and whisky were given, and the delivery was effected with forceps, but death ensued on the fourteenth day of the puerperium. Nothing is said of the fate of the child. Dr. Sothoron believes that interruption of the pregnancy in the early stage would probably have prolonged

the mother's life, and in replying to the discussion on his paper the author said that he considered dyspnoea as the danger signal in all the heart cases. In the discussion Dr. Sprigg stated that no complication of labour was worse than a severe cardiac lesion, and thought that in mitral stenosis pregnancy should always be terminated at the earliest possible date. Dr. Fry gave the mortality of all cardiopaths in labour as about 5 per cent.; in his own thirty to forty cases he had only had one death. Dr. Miller suggested that since it was not possible to prevent the marriage of a cardiopath, that perhaps it would be advisable to prevent the pregnancy danger by removing the tubes prior to marriage. Dr. Thomas said the majority of heart lesions went through pregnancy without loss of compensation.

It is very evident that there exists a great diversity of views regarding the gravity and management of heart disease as a complication of pregnancy and labour. The extremes would seem to be removal of the Fallopian tubes in a girl suffering from heart disease before permission to enter the married state is given, and, on the other hand, permission to marry qualified by a mild warning that disaster may follow unless care be taken. It must not be forgotten that many women with heart disease pass through their pregnancies with no trouble, far less serious danger, just as many male cardiopaths live strenuous lives and even reach old age. It will therefore be wise to lay down no hard-and-fast rules. The question of permission to marry is confessedly difficult. Even if engaged couples resort to the physician for advice as to the justifiability of marriage in the presence of a heart lesion, it is a matter of much difficulty to give an opinion which is really of value, and, at the same time, sure of acceptance and performance. The candidates for matrimony, if refused permission by one physician, often receive it from another of a more hopeful or a more complaisant disposition. The ideal treatment of pregnancy when it has occurred in a woman with heart disease is not early termination of the gestation with the sacrifice of a foetal life—that would only be justifiable if all women with heart disease in pregnancy died or were seriously damaged in health—but such a careful management of the mother that she be carried through safely to the full term and give birth to a living infant. It may, however, be found necessary to induce premature labour, but that is entirely a different matter, for it gives a chance of survival to the infant. Until it be shown that a heart lesion in pregnancy is a necessarily fatal complication, the value of the life of the unborn infant cannot be regarded as a negligible quantity. The rest and routine of a hospital often work wonders in the case of heart disease in pregnancy; and in private practice the advantages of these measures can be obtained by a little care and supervision of the patient's mode of life, diet, exercise, and the like. With regard to medicinal means, and especially the use of digitalis, strychnine, and alcohol, each case must be separately considered.

PHYSIOLOGY.

By T. H. MILROY, M.D.,

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ABSTRACTS OF SOME COMMUNICATIONS GIVEN AT EIGHTH INTERNATIONAL CONGRESS OF PHYSIOLOGISTS (Vienna, 30th September 1910).

Regulation of Respiration.—Hans Winterstein described an interesting series of experiments to illustrate the part played by the blood in the regulation of respiratory movements. The experiments were carried out on young rabbits (4 to 8 days old) in the following way:—Ringer's solution, saturated with oxygen and with or without the addition of blood, was circulated at such a rate through the vascular system that apnoea was rapidly produced. If the circulation was stopped or slowed, respiratory movements started at once. Respiratory movements could also be started by the addition of a small quantity of carbonic acid to the circulating fluid, but not by simply rendering the fluid poorer in oxygen. The latter produced a depression of reflex excitability, which returned to normal when the oxygen saturation was increased. In cases in which an oxygen hunger resulted in stimulation of the respiratory centre, the effect was evidently produced by the accumulation of acid substances in the blood during the asphyxia. Winterstein also showed that other weak acid solutions, e.g. $\frac{N}{1000}$ HCl. Ringer, usually produced a marked stimulation of the centre. He therefore concluded that the regulation of respiration is brought about by the concentration of the H-ions of the blood.

The same investigator described a method to demonstrate the automatic activity of the respiratory centre. The animals (cats) were curarised, so that all afferent impulses from the respiratory muscles were cut off, and, as an index of the activity of the centre, the action currents of the central stump of the cut phrenic nerve in the neck were led off to a string galvanometer. In all cases, whether the artificial respiration was stopped or a continuous air stream without respiratory movements was employed, the respiratory centre sent out rhythmical discharges, which were therefore the expression of a purely automatic activity of the centre.

Respiratory Gaseous Exchange.—Haldane and Douglas, employing the CO method of Haldane and Lorrain Smith, have shown that in mice, rabbits, and men, when a very low percentage of CO is breathed, so that the blood does not become more than 25 per cent. saturated, and symptoms due to want of oxygen are entirely avoided, the arterial oxygen pressure is about equal to that in the alveolar air and does not exceed it. Apparently, therefore, the absorption of oxygen is by diffusion alone under normal resting conditions. When, however, a

higher percentage of CO is breathed, and symptoms of want of oxygen begin to appear, the arterial oxygen pressure rises above that in the alveolar air. In the case of mice, in which nearly all the experiments with high percentages of carbonic oxide were made, the arterial oxygen pressure may rise to 250 mm. of mercury, or more than double the alveolar oxygen pressure. Want of oxygen in the tissues of the body thus brings into play a supplementary secretory activity by which oxygen is actively absorbed from the alveolar air into the blood.

Stimulation of Muscle.—Lee described the influence of small accumulations of fatigue products on the excitability of muscle. He explained the production of the “treppe” or staircase phenomenon as follows:—The irritability of muscle, as indicated by the threshold of stimulation, is found to increase progressively throughout the course of the “treppe.” The irritability of muscle, indicated in the same way, is also increased by small quantities of fatigue substances such as carbonic and lactic acids. Under the influence of small quantities of these substances a muscle is able to carry out greater contractions than before. He therefore concludes that the “treppe” represents increased irritability and increased working power, due to the action of small quantities of fatigue substances such as carbonic and lactic acids, and possibly other substances. Lee and Morse explained the phenomena of summation of stimuli in the same way.

Influence of Placenta Extract upon Secretion of Milk.—Lederer and Pribram collected goat's milk by passing a catheter into the mammary gland duct and then tested the effects produced by intravenous injections of fresh placenta extracts. They found (1) that milk secretion was increased; (2) that the extracts lost their activity when kept for some time, or when warmed to 65° C. for one hour; (3) that this action was specific for placenta extracts; (4) that larger doses produced other effects, such as increase in the coagulability of the blood, and, as a result of this, serious vascular disturbance and death.

Effects of Parathyroidectomy.—Carlson and Jacobson summarised their results as follows:—(1) Complete parathyroidectomy may produce no symptoms or only transitory symptoms of tetany. (2) In the case of the animals exhibiting tetany symptoms, the concentration of ammonia in the blood is considerably greater than the normal, and this is associated with diminished power of the liver to destroy ammonia. (3) When ammonium carbonate is injected intravenously until the ammonia tetany appears and samples of blood then drawn and analysed, the ammonia concentration is found to be practically identical with that in parathyroid tetany. (4) There is a great similarity in the symptoms of experimental ammonia tetany, parathyroid tetany, and the symptoms of meat intoxication in Eck's fistula animals, the latter being definitely due to liver insufficiency. (5) These facts support the hypothesis that the parathyroid tetany is due, at least in part, to liver depression and consequent ammonia intoxication.

Changes in Blood after Thyroidectomy.—Reid Hunt has shown that mice fed on thyroid substance are able to withstand a larger dose of aceto-nitrile than normal animals, owing to the greater difficulty in the splitting of the CH_3 group. Trendelenburg, following up this work, studied the effects produced by feeding with the blood of thyroidectomised animals, and gave a short résumé of his results at the Congress. He found that mice fed with normal blood showed no increased resistance against aceto-nitrile, while those which had received the blood of thyroidectomised cats withstood twice the lethal dose. He therefore concluded that after thyroidectomy there accumulate in the blood products which are similar to the thyroglobulins found in the gland, and that these products are the results of cell activity, and do not come from the alimentary canal, as they are present in starving thyroidectomised animals.

Actions of Calcium Salts.—Hamburger stated that the addition of .005 per cent. CaCl_2 to serum or to a .9 per cent. NaCl solution increased rather more than 20 per cent. the phagocytic power of leucocytes towards carbon particles. So also in the case of animals which have received daily rectal injections of .1 gr. CaCl_2 , the leucocytes acquire a greater phagocytic power than normal. Barium, strontium, and magnesium salts do not possess this property.

Chiari and Januschke showed some rabbits which had been previously treated with CaCl_2 . These gave little or no inflammatory reaction when oil of mustard was dropped into the conjunctival sac, while normal animals reacted very markedly. Also rabbits treated with CaCl_2 and then given a lethal dose of diphtheria toxin showed no fluid exudate in pericardial or pleural sacs, unlike those animals which had not received the CaCl_2 treatment.

THERAPEUTICS.

By FRANCIS D. BOYD, C.M.G., M.D.

“VASOTONIN.”

THE therapeutics of arterial hypertonus occupy a very important place in modern medicine. Clinicians are constantly faced with the problem—Is it advisable to interfere with a high blood-pressure, and if it is advisable, what are the best means at our disposal for lowering blood-pressure? The clinician will tell you that good results are obtained by the use of iodides, the pharmacologist that iodides have no appreciable influence upon blood-pressure. The pharmacologist suggests the nitrites, the clinician finds that frequently the nitrites fail, and even when they are successful, their action is transient and accompanied by disadvantages, in that they affect the breathing and are liable

to produce violent headache and at times confusion. Theobromine, again, has disadvantages in disturbing digestion, and theobromine-sodium-salicylate may irritate the kidneys. The large number of medicinal substances which has been employed in the therapeutics of arterial hypertonus shows that the ideal substance is still wanting. Given a substance which will lower blood-pressure without injuriously affecting the heart and respiration, there should be a wide field for its usefulness in the therapeutics of hypertonus. Such a substance Müller and Fellner believe they have succeeded in discovering in "vasotonin" —a combination of yohimbin and urethan. Yohimbin is an alkaloid which, even in small doses, causes increased excitability of the respiratory centre. It has an action upon the walls of the blood-vessels themselves, and even when applied locally is vaso-dilator and anæsthetic. Large doses produce a continued fall in blood-pressure, and lethal doses paralyse the heart. On the genital organs yohimbin has an effect. Small physiological doses increase the excitability of the sacral region of the cord; somatic erection is thus more readily called forth without the production of any general rise in reflex excitability. The substance has been largely used for this purpose both in human and in veterinary medicine. The influence of the substance upon the respiratory and sexual centres would be a considerable disadvantage in its use in arterial hypertonus, but these disadvantages Müller and Fellner claim to have got over by combining it with urethan. They claim that a new and distinct substance is formed which has a higher melting point than its constituents, and has no action in exciting the respiratory centre. Sprigel, however, is inclined to think that "vasotonin" is a mixture, not a new substance, and that the combination of yohimbin with any of the artificial hypnotics would have an equally satisfactory action.

Müller investigated the pharmacological action of vasotonin and finds that the dose for subcutaneous injection is one milligramme for every kilo of body weight. So far he has not determined if the pharmacological action can be developed by oral administration. In animals it was found that subcutaneous administration was followed by a definite fall in blood-pressure and a distinct increase in the volume of the extremities, as shown by plethysmograph observations. At the same time there was a slight shrinking of the kidney. With larger doses the effect was more marked. No alteration in the frequency of the pulse was observed. A very important question in estimating the therapeutic value of the substance was whether it exercised any action upon the heart. The authors conclude that former perfusion experiments on the isolated heart are of no value in drawing conclusions, owing to the excessive doses used in the perfusing fluid. They conclude that the action is purely peripheral, and that the heart is uninfluenced by therapeutic doses. They conclude from their experi-

mental work that the cerebral vessels are dilated by vasotonin when administered in fairly large doses, and that this action is developed simultaneously with a lowering of blood-pressure. The substance has therefore the property of lowering blood-pressure by dilating vessels, especially in the extremities, and yet does not injuriously affect the heart. Its action is without the disadvantages of the nitrites which affect the respiration, and, in addition, its influence is more prolonged than that of the nitrite group.

Clinically, patients whose condition seems to demand measures for the lowering of blood-pressure may be divided into two classes:—

1. Passing conditions of increased pressure, to which belong angina pectoris, crises of vessels, and irritable conditions of the vasomotor centre.

2. Prolonged and advancing conditions of increased pressure, particularly arterio-sclerosis with all its concomitants, different forms of poisoning, such as lead, nicotine, and alcohol, and finally chronic kidney disease. The latter, however, the authors justly look upon as often compensatory in nature, and to be looked at from a standpoint of its own.

In the cases examined vasotonin was given hypodermically daily or every second day over a period of thirty days. The injections were painless. Charts of the blood-pressure are given, which the authors claim are in almost perfect agreement with Müller's animal observations, *i.e.* lowering of blood-pressure and raising of the plethysmogram. This occurs just as constantly in man as in animals; increased peripheral circulation always occurred, but the lowering of blood-pressure was often very different in its quantitative developments.

As regards subjective phenomena, some patients experienced marked amelioration in their general condition, others were not sure that they were improved. In mild cases of angina pectoris improvement was rapid and marked, in severe cases it was gradual and only after repeated injections. In cases of chronic hypertonus, besides the disappearance of the subjective difficulties there was a favourable influence on the central nervous system, with an improved mental state, possibly explicable by a dilatation of the cerebral vessels, which was demonstrated by Müller on animals. Patients with high pressure and cardiac asthma lost the asthma after a few days. Six cases of bronchial asthma are given: three were apparently cured, two relieved, and one unchanged. It is to be noted that in none of the cases was sexual equilibrium disturbed, and unpleasant symptoms were very slight—never as bad as after a member of the nitrite group.

Stachelin in a very careful and elaborate paper confirms most of the results of Müller and Fellner. Clinically he found that the pulse frequency was usually not influenced, or if at all increased in

frequency, only slightly so. The blood-pressure in his cases was taken a few hours after injection, thereafter daily if possible. His records show in the first eight cases in the table a more or less marked fall in pressure—40 to 10 mm. mercury—sometimes coming on in half an hour, sometimes after one to two hours, sometimes later. The day following the injection the blood-pressure rose again to the original in six cases, in one case after a day or two; in four cases the pressure remained low, or sank even lower after the first day. A second group of cases showed no influence of the injection upon the blood-pressure. A third group showed a transient rise in blood-pressure after the injection, which in some reached as much as 40 mm. Hg. Pulse tracings showed that the rise after injection was not due to a contraction of the vessels of the extremities; even when the blood-pressure rose it was in spite of a dilatation of the peripheral vessels. Repeated injections in some cases showed a prolonged lowering till the pressure reached normal; in others a single injection lowered the pressure to normal, and further injections had no effect. How long the lowered pressure would last the author is not prepared to say. In most of the cases there was improvement in the subjective symptoms, which lasted for some days after the injection. Some had unpleasant symptoms the day of the injection, with considerable improvement the following day. In some no appreciable result followed the injection. In eight cases out of thirty-five unpleasant effects followed administration—heat, tension in the head, slight palpitation and oppression, very like the phenomena experienced after the inhalation of amyl nitrite, only less pronounced. These phenomena were not dependent upon the initial rise in blood-pressure, for in two cases they occurred coincident with a lowering in pressure. In a limited number of cases there was headache and giddiness eight hours after administration. The discomforts seemed to be caused by extreme vascular dilatation, and it was noted that in some a tolerance was set up, in that the discomforts did not recur after the first injection. Sexual increase was noticeable in a few cases. The author finds that vasotonin is particularly brilliant in its action in angina pectoris, and details the clinical phenomena in a number of cases in which it was successful. In eighteen cases in which the distress could be ascribed to arterio-sclerosis, in three there was no result, in the rest improvement, which lasted generally two days, sometimes longer. After repeated injections more lengthy results were obtained.

Stachelin concludes that vasotonin is of use—(1) In cases of angina pectoris when we have ground for believing in a coronary sclerosis. The results are then very favourable. (2) In all difficulties due to arterio-sclerosis, independent of whether the blood-pressure is raised or not. (3) In cases in which the blood-pressure is raised, even though there be no provable arterio-sclerosis.

To obtain satisfactory results it is well to begin with half a dose or even less. The dose should only be increased when it is well borne. If unpleasant symptoms are manifest after the injection, the treatment may still be continued, but the small dose should be adhered to and the injections be given at longer intervals. As a rule, two to three injections may be given weekly. To get a prolonged effect ten injections are usually necessary—sometimes twenty to thirty—at intervals. The treatment should always be controlled by blood-pressure observations.

From consideration of the papers one forms the impression that in vasotonin we may have a remedy which promises to add materially to our capacity to relieve a class of cases which so far has proved very intractable to therapeutic measures.

REFERENCES.—Müller and Fellner, jr., *Therapeutische Monatsschrift*, Heft 6, Juni 1910. Sprigel, *Ibid.* Heft 7. Stachelin, *Ibid.* Heft 9 und 10, September-October 1910.

NEW BOOKS AND NEW EDITIONS.

A System of Medicine. Vol. VII. Diseases of the Nervous System. By OSLER and M'CRAE. Pp. 969. London: Henry Frowde and Hodder & Stoughton. 1910. Price 30s. net.

WE welcome the seventh volume of this great work, and we feel sure that in point of merit it lacks nothing of the excellence that has characterised the previous volumes. It deals exclusively with the diseases of the nervous system, containing twenty-one chapters written by sixteen authors. The contributors to this volume are mostly American, but we are glad to see that three at least are British—Drs. Edwin Bramwell, E. Farquhar Buzzard, and Gordon M. Holmes. These three have carried out their task in a masterly way, and the great traditions of neurology in our country have not suffered at their hands. Many of the American neurologists have a world-wide reputation, and it is fitting that they should be contributors to a standard work of this kind.

Chapter I. (by Dr. Lewellys F. Barker), on the Introduction to Diseases of the Nervous System, deals with the senses and their symptomatology, disturbances of sensation, disturbances of more complex psychic processes, disturbances of mobility, and anomalies of speech, writing, and reflexes. The writer of this chapter deserves the highest praise for the able manner in which he has performed his task. It is a brilliant exposition to the introduction of the diseases of the nervous system.

Dr. Harry M. Thomas's remarks on apoplexy (Chapter IX.) deserve special note in passing.

In Chapter X., Dr. Harvey Cushing deals with tumours of the brain and meninges. An account is given of the symptoms arising from these, with the diagnosis and treatment. The surgical measures for their relief are briefly discussed.

The remarks of Daniel J. McCarthy on paralysis agitans deserve more than passing reference, as they throw fresh light on this obscure malady.

Dr. B. Sachs contributes the chapter on Syphilitic and Parasyphilitic Diseases of the Central Nervous System. The Wassermann reaction is referred to, and the author believes that in all doubtful cases of tabes and general paresis the blood should be frequently examined, and if there should be a positive reaction, treatment should be energetically persevered in, even though the patient may present no specific symptoms.

Dr. Charles N. Burr's article on "Neurasthenia" is ably written, and gives the practitioner much room for thought.

The chapter on Migraine, Neuralgia, Professional Spasms, Occupation Neuroses, and Tetany, by Dr. Smith Ely Jelliffe, deserves special mention, particularly the article on "Tetany," although we think that a larger bibliography would have made the paper still more valuable to the physician.

Dr. B. Sachs's article on "Amaurotic Family Idiocy" (Tay-Sachs Disease) includes an account of this rare disease, observed by Waren Tay and the author quite independently.

The volume has many illustrations, and a good index.

We heartily recommend this book to all interested in neurology, as we believe it to be one of the most complete text-books of its kind in the English language. The editors have every reason to feel gratified on the completion of the seventh volume of this monumental work.

A System of Medicine. Edited by Sir CLIFFORD ALBUTT, K.C.B., and HUMPHRY DAVY ROLLESTON, M.A., M.D., F.R.C.P. Second Edition. Volume VII. Pp. xvi. + 900. London: Macmillan & Co., Ltd. 1910. Price 25s. net.

THE seventh volume of the new edition of Clifford Allbutt's *System* treats of diseases of the muscles, the trophoneuroses, diseases of the nerves and vertebral column, and diseases of the spinal cord. It thus covers the ground occupied by the latter part of volume vi. and the first part of volume vii. of the old edition. The advances in knowledge made during the past decade are reflected in the extensive changes which have been required to bring this volume up to date.

To the sections on diseases of the muscles have been added articles on "Amyotonia Congenita (Myotonia Congenita of Oppenheim)," by Dr. Collier; "Myasthenia Gravis," by Dr. E. Farquhar Buzzard; "Family Periodic Paralysis," by Professor Michell Clark; and the "Neuritic Type of Progressive Muscular Atrophy," by Dr. F. E. Batten. In his revision of the article on the "Myopathies" Dr. Batten refers to the recent observations by Erb and Jendrassik of recovery from the disease. Myositis ossificans, which was dismissed in a few lines in the last edition, now has a long article to itself, which gives an excellent description of this rare and interesting disease. There is also a good plate showing the characteristic deformity of the toes. Within the last few years a good many cases of chronic oedema of the legs have been reported, and in his article on "Trophoneuroses" Dr. Turney describes trophoedema at some length. The nature of the condition is not as yet fully understood, and we are warned against including under this head every case of oedema whose origin is obscure.

In the section dealing with diseases of the cord the first place is given to Dr. Starr's article on "Acute Anterior Poliomyelitis," which gives the fruits of the recent work of Levaditi, Landsteiner, and Flexner on the infective nature of the disease. The article on "Myelitis" has been rewritten by Dr. Buzzard, who also contributes an account of Landry's paralysis, in which he lays stress on the importance of distinguishing it from acute poliomyelitis, myelitis, and polyneuritis. He regards it as a much more fatal disease than any of these, and thinks that many of the cases of so-called Landry's paralysis which have recovered were in reality examples of one of the former group of maladies. One of the most interesting new articles is that on "Caisson Disease," by Leonard Hill, which embodies all the recent work of the author, and of Haldane, Boycott, and others. As a prophylactic, Dr. Hill prefers slow decompression to the stage decompression introduced by Haldane. Batten and Holmes are responsible for the revision of the late Dr. Beevor's article on "Motor Neuron Disease," to which a new account of the Werdnig-Hoffmann type of progressive muscular atrophy of children has been added by Dr. Batten. Among other additions to the volume are the articles on "Subacute Combined Degeneration of the Spinal Cord," by Dr. Collier; "Family and Hereditary Ataxy (including Friedreich's Ataxia, Spino-Cerebellar Ataxia, and Cerebellar Ataxia)," by Dr. Holmes; "Syphilis of the Cord," by Dr. Wilfrid Harris; and "Tumours of the Cord" by Dr. Edwin Bramwell. The most important new feature of the volume, however, comes from the pen of Dr. Mott, in the shape of an admirable introduction to "Neuropathology." This article extends to over a hundred pages, and well repays most careful perusal, for it gives an account of the present state of our know-

ledge, which is excellent and authoritative, written as it is by one who has himself done so much to elucidate the subject. Sir William Gowers's new article on "Medical Ophthalmology" is also a valuable addition to the volume.

The high standard of the previous volumes of this work is fully maintained by the present volume.

Tuberculosis: A Treatise by American Authors. Edited by ARNOLD C. KLEBS, M.D. First Edition. Pp. 939. London: D. Appleton & Co. 1909. Price 25s.

THIS is a comprehensive, practicable, and valuable work. Dealing as it does with the etiology, pathology, frequency, semiology, diagnosis, prognosis, prevention and treatment of tuberculosis, this volume of reference leaves no part of the field uncovered. The different chapters are written by men, each of whom has made the particular section of the subject therein dealt with his own. The list of the writers represents a very galaxy of talent. Their attainments have won for many of them a world-wide reputation. The names of Osler, Klebs, Trudeau, Knopff, Hermann Biggs and Baldwin, and von Pirquet have only to be mentioned to convey to the mind of the reader the fact that we have in this American work—for it is American from beginning to end—the last word which America has at present to say to us on this important subject. It is quite apparent that the guiding consideration in the compilation of the work has been the needs of the general practitioner. This has throughout been kept consistently in view. Hardly less skill has been shown by the writers in excluding much that, although interesting and attractive, is unsuitable, than in selecting and presenting us with those facts and aspects of the subject which are essentially of practical value. In this way a bewildering aggregation of details has been avoided, and a volume of the very highest possible value, complete and comprehensive in all its branches, has been compiled. To describe or analyse in a critical manner within the scope of this review the different phases of the subject dealt with by the various writers who have collaborated with Klebs is not possible. We note that the historical introduction by Osler is worthy of its author, and what higher praise can be given than that. The discoverer of von Pirquet's test deals with tuberculosis in childhood; the surgery of tuberculosis has been entrusted to Leonard Freeman of Denver; one aspect of the treatment to Trudeau; and at the hands of Knopff and Hermann Biggs public and municipal measures for dealing with the tuberculosis problem in large communities receives full and adequate treatment. These constitute the more familiar themes, and are fully and ably handled. Others of a less popular and more highly technical nature have been

described in a not less able and attractive manner. Chapters on the Etiology of the Tubercle, by Ravenel; the Physiology of Climate in Relationship to Tuberculosis, by Sewall; the Pathology of Tubercle, by Hekloen of Chicago; and the Specific Treatment of Tuberculosis, by Lawrason Brown of Saranac, contain a wealth of knowledge and some wisdom.

Two hundred and forty-six illustrations are employed to supplement the text. There is an excellent bibliography, and a complete index adds greatly to the convenience of the reader. Over one hundred pages are devoted to appendices which deal with so diversified matters as: A Leaflet for Teachers; The Tuberculo-Opsonic Index; Facts a Mother should know concerning Tuberculosis; and Diet Lists for Phthisis. The comprehensiveness and the intensely practical nature and the high value of the work are thus obvious. Amongst those volumes of reference in English on the wide subject of tuberculosis available to medical practitioners, to specialists, and consultants, we unhesitatingly accord this work of Klebs the first place.

Practical Pathology: A Manual for Students and Practitioners. By G. SIMS WOODHEAD, M.A.(Cantab.), M.D.(Edin.), Hon. LL.D. (Toronto). Fourth Edition. With 275 Coloured Illustrations. Pp. 798. London: Henry Frowde and Hodder & Stoughton. 1910. Price 31s.

THE first edition of this well-known work appeared in 1883, so that it may now be said to have been a standard text-book for nearly thirty years.

It was probably the first work which attempted to deal with the practical aspect of pathology, and it still remains the foremost book of its kind. Already on three different occasions eulogistic criticisms of the work have appeared in the columns of the *Edinburgh Medical Journal*.

In this, the fourth edition, the general plan of the earlier editions has been preserved.

Commencing with a chapter on the Methods of Making Post-Mortem Examinations, there follows a long chapter on the Microscope and its Use, Methods of Fixing, Cutting, Staining, Mounting, and so on. The third chapter is devoted to inflammation, organisation, and repair. This has been greatly enlarged in the present edition, and new matter on the subject of the blood-cells has been introduced. In the ten chapters following, the various organs and tissues of the body are treated of in detail, first as regards their naked-eye and microscopic appearances under normal conditions, then with descriptions of the various diseased conditions. The naked-eye appearances are dealt with first, then the

microscopic changes to be seen under low and high powers. This method of describing the changes under the microscope is well adapted for the beginner, but necessarily leads to considerable repetition. The number of diseased conditions dealt with has been, in the case of several organs, increased. The chapter on the Organs of Generation in the Female, originally contributed by the late Dr. J. Milne Chapman, has been revised by Dr. T. Watts Eden. The descriptions of bone marrow diseases are entirely new.

The fourteenth chapter, which is devoted to tumour formations, has been considerably enlarged. Certain animal and vegetable parasites, more particularly the organism of malaria, are dealt with in the last two chapters.

We have nothing but praise for the method and matter of the book. One or two small omissions have been made in regard to staining methods. For example in staining with Weigert's elastic tissue method it is advisable to treat sections stained with lithium carmine with acid alcohol for twenty-four hours before putting them in the resorcin fuchsin. Then one wonders why the idea that 25 per cent. sulphuric acid is necessary in carrying out the staining of the tubercle bacillus has persisted for so long. A 1 per cent. hydrochloric acid in alcohol is all that is necessary; the alcohol test is applied along with the acid, and delicate structures in tissues are not damaged to anything like the same extent.

With regard to the method of treating the diseased conditions in the various organs, we have already said that although it necessarily leads to considerable repetition, it is probably the only one possible. We are inclined to think that the junior student, were he to start investigating diseased organs by himself, with the aid of such a book, would soon encounter difficulties. It is the typical condition, selected probably from among many cases, which is here described, and the typical condition is in pathology, as in so many other sciences, somewhat of a rarity. This difficulty is, however, inevitable, and with greater experience the young pathologist will come to recognise that there are variations from the typical, and that these variations do not render the study of the subject hopeless, but that the opinion which he forms of a diseased organ must be gathered from a consideration of all the facts at his disposal.

In such a book as this the illustrations form a most important part of the work. To them the student turns to see what the typical thing really looks like, and therefore the more nearly the appearance in the picture resembles the actual thing seen, the better. Photographs and monochrome drawings are all very well, but colour is almost of more importance than form with the student. With regard to the 275 coloured illustrations in the present volume, we can only say that they are magnificent. It is well worth the expenditure of the price of the book to obtain them alone.

Many of the drawings are those which appeared in the earlier editions when picro-carmin and logwood were the stains in vogue, but very many are altogether new, and are stained with the routine methods specially adapted to bring out certain points. We congratulate the author, the publishers, and the lithographers on having produced a book illustrated in this way, but we would also congratulate Mr. Richard Muir, whose initials, now familiar to readers of all sorts of journals and text-books, appear at the foot of most of the drawings. Naturally the high power views are the most successful, but some of the low power work, particularly in the case of some of the bone sections, is most admirable.

Such illustrations cannot be reproduced for nothing, and certainly the price of the book will limit its use among students. But we have no hesitation in advising any student to waste no time in buying this book even if he buys no other.

Post-Mortem Manual: a Handbook of Morbid Anatomy and Post-Mortem Technique. By CHARLES R. BOX, M.D., B.S., B.Sc.(Lond.), F.R.C.P.(Lond.), F.R.C.S.(Eng.). Pp. 335. London: J. & A. Churchill. 1910. Price 6s.

THIS little book is a most excellent compendium for the use of students and practitioners of post-mortem work in most of its departments. Many useful hints will be found even for those more experienced in such work. Methods for examining disease in parts of the body not usually investigated are described, along with the best way of replacing structures and removing traces of the sectio. In addition, the appearance found in the commoner and even the more uncommon diseased conditions are detailed. In this we think that perhaps the book errs somewhat in the matter of length, seeing that morbid appearances are entered into fully in all text-books of systematic pathology.

We think that a somewhat serious omission is made in not describing methods for obtaining cultures from the blood and organs after death. No doubt such descriptions may be found in bacteriological text-books, but these processes form nowadays such an essential part of the work of the post-mortem room that a book of this kind can scarcely afford to ignore them. No doubt indications are given where bacteriological examinations are necessary, but no mention is made of the method of carrying out such, or of the apparatus required.

Another matter which might well have been touched upon is the methods best suited for preserving the various tissues and organs for use, either as mounted specimens or for the microscope. Here, again, no doubt methods of fixation and hardening are dealt with in books on histo-pathological methods. But such a book as the present would

be more valuable were all matters dealt with that concern the pathologist in the post-mortem room. And, as a matter of fact, the treatment and preservation of specimens destined for mounting receive almost no attention in any form of text-book.

These slight omissions do not, however, detract from the general soundness of the work, which we have no hesitation in strongly recommending.

A Manual of Physiology. By G. N. STEWART, M.A., D.Sc., M.D., D.P.H.

Pp. 1064. London: Baillière, Tindall & Cox. Sixth Edition, 1910. Price 18s. net.

WE have no hesitation in saying that Professor Stewart's manual presents a concise, correct, and up-to-date account of as much physiology as is required of the student of medicine.

Any adverse criticism which we have to offer is largely discounted by the fact that we are dealing with a sixth edition. At the same time the book falls short of our ideal of a students' text-book. In a word, it seems to us lacking in perspective. We confess that, probably as the result of a pious up-bringing, we are prejudiced in favour of the principle of the Shorter Catechism, which begins by expounding the chief end of man, and then proceeds to elaborate the means by which that end can be accomplished. Professor Stewart's opening statement is that "living matter, whether it is studied in plants or in animals, has certain peculiarities of chemical composition and structure." We find something lacking in the way of a more general introduction, or of some principle to give connection and continuity to a series of essays (in themselves excellent) on the different departments of physiology.

At the end of each section several practical exercises are given, with the laudable intention of combining laboratory work with theoretical teaching. In his preface the author suggests that this can be done by dividing the class into sections of not more than four students for practical work. Unfortunately, this arrangement is meantime out of the question in the Scottish schools.

It would certainly be a boon to the teacher to have elaborated such a scheme as the author suggests, but no attempt is made to equalise or even to indicate the amount of time which the laboratory visits would take, or the intervals which would elapse between them, and we think that Professor Stewart's arrangement could only be carried out here with a disregard of times and seasons which would play havoc with a curriculum already overcrowded and difficult to manage.

The book is well illustrated, and many of the diagrams are drawn in white, on a black ground, with telling effect. We think that a few illustrations of somewhat complicated apparatus, such as that on p. 707, might with advantage be made more diagrammatic. As they stand

they are of little use to the student who will see the experiments, but outline diagrams would facilitate his understanding of them, and would fully elucidate the text.

To the practitioner or student who desires enlightenment on any given subject in physiology we can recommend no better source of information, but (leaving his teacher out of account) we consider this a difficult book to place in the hands of the junior student.

It is beautifully bound, and is the only students' manual we know which is furnished with a book-marker.

Practical Physiology. Edited by M. S. PEMBREY, M.A., M.D. Contributors, A. P. BEDDARD, M.A., M.D.; J. S. EDKINS, M.A., M.B.; MARTIN FLACK, M.A., M.D.; LEONARD HILL, M.B., F.R.S.; J. J. R. MACLEOD, M.B.; and M. S. PEMBREY, M.A., M.D. Third Edition. Pp. 480. London: Edward Arnold. 1910. Price 14s. net.

THE third edition of this *Practical Physiology* shows no increase on the first edition. It still consists of about 470 pages without the Index, 269 devoted to Experimental Physiology and 204 to Chemical Physiology. The clear line of demarcation between elementary and advanced teaching which characterised the earlier editions has, we regret to see, been abandoned, and it seems to us that, in its present form, it will prove of service, not so much to the student as to the demonstrator of physiology. It is almost to be regretted that the authors have not made it frankly a laboratory handbook, leaving out all the didactic teaching which really has its proper place in textbooks of the science, and not in such a practical guide. For the student it appears to us far too detailed, extended, and diffuse, and it suffers from the fault of attempting to combine didactic with practical teaching.

As was to be expected from such a group of authors, every part of the work bears the mark of a master hand. Each section is full of useful information which is made readily available by an excellent Index. The book should be in every physiological laboratory.

Handbook of Diseases of the Ear. By RICHARD LAKE, F.R.C.S. Third Edition. Revised and Enlarged. Pp. 248. 70 Illustrations. London: Baillière, Tindall & Cox. 1910. Price 7s. 6d.

As the first edition was only published in 1903, the appearance of a third edition speaks well for the popularity of the book. The present volume only contains six pages more than the second edition, but the pages themselves are larger. The illustrations do not compare well

with those in some recent publications on the same subject. The book is best suited for students who wish to obtain a certain amount of information on the subject at a reasonable price. Tuberculous disease of the ear is not well described, and much valuable space is wasted on intra-tympanic operations, which are hardly ever performed. On the other hand, the sections on thromboses of the sigmoid sinus and on labyrinth operations are excellent—the author has done some pioneer work on the latter subject. The chapters on the Inner Ear have been greatly improved since the second edition. At the end we find a useful list of 44 prescriptions.

Die direkte Laryngoskopie, Bronchoskopie und Oesophagoskopie. By Professor BRÜNINGS, Jena, formerly Privatdozent at the University of Freiburg i Br. Pp. 396. 111 Illustrations. Wiesbaden: Verlag von J. F. Bergmann. 1910.

As the title indicates, this book is written in German, but the style is simple and the sentences are not unduly long. In this work we get a complete account of the latest methods in the direct examination of the larynx, bronchi, and œsophagus. The book is well printed on good paper, and the illustrations are excellent. It must be confessed, however, that the author is rather egotistical, and hardly gives sufficient credit to his old chief, Professor Killian, who deserves the credit of making bronchoscopy a practical procedure.

The first part of the book is occupied by a description of instruments and methods of illumination—the author is well known for his remarkable facility in the invention of new apparatus, among which we may note instruments for dilatation of the bronchi and intubation of strictures (pp. 38 and 39). There can be no doubt that Brünings has greatly improved on the former instrumentarium available for direct examination and treatment of the region. He has evidently a comprehensive knowledge of optics, mechanics, and electricity, and further, is able to make his meaning plain to the less accomplished reader. The second part of the work is concerned with anæsthesia—local and general. Brünings strongly recommends the inhalation of oxygen in many cases in addition to the anæsthetic. The chapter on the Passage of the Laryngeal Instruments is freely illustrated by photographs of the author himself at work, while the difficulties and dangers are fully dealt with. The section on bronchoscopy is preceded by an excellent account of the anatomy of the bronchial tree, and some really beautiful skiagraphs. On page 295 *et seq.* the author shows how conditions observed through the bronchoscope may be located in the chest-wall by his method of bronchometry. A special chapter is devoted to the examination of children by the direct method. The last section of the

book is devoted to œsophagoscopy ; in this the anatomy and physiological movements of the œsophagus during swallowing and breathing are described, and the necessity for a thorough preliminary examination of the patient is emphasised. The pneumatic œsophagoscope is of use in the diagnosis of spasmodic and other strictures, and is said to be free from danger. An English translation of this book would be a great advantage at the present time.

Rhinology: A Text-Book of Diseases of the Nose and the Nasal Accessory Sinuses. By PATRICK WATSON WILLIAMS, M.D. Pp. 273. 47 Plates (28 Stereoscopic), and 146 other Illustrations. London: Longmans, Green & Co. 1910. Price 15s. net.

DR. WATSON WILLIAMS'S former work on rhinology and laryngology has now been split up, and the present volume deals only with diseases of the nose and its accessory sinuses. In this way a work has been obtained which is not merely a "cram" book, but is intended for advanced students and practitioners. It would only be right to say that Dr. Williams has also much to teach the specialist. The work is well got up, and the illustrations, many of them in colour, are excellent. The book begins with a clear description of the anatomy and physiology of the nose, and of the methods of examination ; these sections include a good account of the development of the nose and mouth. The next section deals with the subject of rhinitis, and here, as throughout the work generally, a good deal of space is devoted to pathology. The subject of treatment—medicinal or operative—is always fully and clearly dealt with, but in the section on tuberculosis of the nose the author only mentions access by the natural passages : in many cases this is insufficient. The section on diseases of the pharyngeal tonsil is particularly good. Nasal polypi are still classed under the heading of neoplasms, though the author recognises that the majority of cases are of inflammatory origin. In the section on the nasal septum the operation for submucous resection of the deviation is well described and illustrated. In the treatment of hay fever the author—himself a sufferer—recommends that the nose should be sprayed with biniodide of mercury (1-20), though he acknowledges that the pain due to this treatment may require morphia. The introductory remarks on the subject of accessory sinus suppuration are very sound, and the section contains a good account of radiography as applied to the diagnosis of this condition. The treatment of sinusitis is also well described, and the plates illustrating the author's own operation on the frontal sinus are exceedingly good. According to the photographs (p. 235) his cosmetic results are excellent. The appendix contains forty prescriptions, along with notes on local anæsthesia and

on the post-mortem examination of the nose and its accessory sinuses. The bibliography contains 150 references. In conclusion, we must note 28 stereoscopic photographs illustrating the anatomy of the region and also the operations on the frontal and maxillary sinuses; most of these are good, but some might be omitted or replaced with advantage.

The Ear and its Diseases. By ALBERT A. GRAY, M.D. Demy 8vo. Pp. 382. 123 Illustrations (37 Stereoscopic). London: Baillière, Tindall & Cox. 1910. Price 12s. 6d. net.

THIS book is a distinct departure from the ordinary text-book on diseases of the ear. The author gives evidence of a much better knowledge of the physiology and pathology of the subject than that usually possessed by the writers of such text-books. There is a large amount of mathematics in the volume, which renders it somewhat difficult for the non-mathematical reader. The stereoscopic plates form a special feature, and are worthy of the author's original method for studying the labyrinth. Mr. Maxwell has again executed some life-like illustrations of the tympanic membrane. In the section on anatomy and physiology the author rightly states candidly that our ideas of the transmission of sound through the middle ear are in a state of flux; on page 57 he makes the remarkable statement that the saccule is larger than the utricle. The section on testing the vestibular apparatus is hardly up to the mark, but it is only fair to state that the author is somewhat sceptical of the value of these tests. Only on page 125 do we begin the diseases of the ear, and even then we must confess that the first section (on injuries and diseases of the outer ear) is much too long when compared with that on catarrhal processes in the middle ear. Rare conditions, such as otomycosis, which many otologists have never seen, are too fully described. Acute suppurative otitis media is well described, and it is worthy of note that the author is, on the whole, against paracentesis of the tympanic membrane. In the treatment of chronic suppuration the author recommends a 25 per cent. solution of Sanitas for syringing the ear; he does not, however, pay sufficient attention to the treatment of chronic suppuration in the Eustachian tube as a part of the process. As mentioned before, the section on catarrhal processes in the middle ear is disappointing, and this is probably due to the unsatisfactory state of our knowledge of the pathology of these conditions. We may suggest to Dr. Gray that in subsequent editions he should include statistics as to the frequency of the various diseases of the ear, and a plate showing the arrangement of the intra-cranial venous sinuses related to the ear, and also one showing the central course of the auditory nerve fibres. On page 262 we have an excellent table giving the differential diagnosis of the intra-

cranial complications of suppurative otitis media. The concluding chapters on Otosclerosis and Diseases of the Inner Ear are the best in the book, probably because the author is often able to give the results of his own original investigations. His suggestion that otosclerosis is due to necrosis of small areas of bone under aseptic conditions is certainly more reasonable than other theories as to the pathology of this condition. To compare the section on diseases of the inner ear in this book with that in similar works only five years old is like comparing the map of Africa to-day with that of twenty years ago. Taken as a whole, the book is pleasant to read, and is not without a touch of humour here and there. At the end we find an index and an excellent stereoscopic lens.

The Suggestive Power of Hypnotism. By L. FORBES WINSLOW, M.B., LL.D. Pp. 90. London: Rebman, Ltd. 1910. Price 1s.

An Introduction to the Study of Hypnotism. By H. E. WINGFIELD, M.A., M.D. Pp. viii. + 175. London: Baillière, Tindall & Cox. 1910. Price 5s. net.

Hypnotism and Suggestion in Daily Life, Education, and Medical Practice. By BERNARD HOLLANDER, M.D. Pp. vi. + 295. London: Sir Isaac Pitman & Sons, Ltd. 1910. Price 6s. net.

THE nearly simultaneous appearance of these three books points to the rapidly developing interest that is now being taken by the public, and more especially by the medical profession, in the relation of mind and brain. While the practice of hypnotism is still confined to the few, and, for various reasons, such as special aptitude, individual interest, and expenditure of time, is likely long so to remain, there can be no doubt that there has been a great awakening to the fact that success in medicine is to a very considerable extent dependent on the power of suggestion. This power is by most exercised unconsciously, but without doubt it might, with immense advantage to the patient and intense satisfaction to the physician, be deliberately cultivated, and its scope widely extended. Dr. Forbes Winslow, in his little *brochure*, narrates briefly the history of hypnotism, and strongly advocates the establishment in this country of a school of psychotherapeutics. He narrates in racy style various applications of suggestion by himself. He defines suggestion as "the mandate of the operator acting upon the subjective mind of the person upon whom such an impression is desired to be made"; but it is not limited in this way, for fashion, the autocrat, is pure suggestion.

Those who wish to have in compact form a reliable little treatise on the phenomena of hypnotism would do well to obtain Dr. Wing-

field's book. He has treated the matter mainly from the experimental point of view, and he relates numerous experiments by Professor Langley and himself, done at Cambridge years ago. A chapter is devoted to Sub-Consciousness, the Subliminal, the Secondary Consciousness, and the evidence in favour of its existence is briefly stated. One could wish that the chapter on Treatment had been longer. Short as it is, Dr. Wingfield gives a large number of cases, mostly cured, some intractable and uncured, all from his own practice. Of course the bulk of the cases are hysteria, neurasthenia, insomnia, and other similar nervous states. Freud's method of dealing with hysterical states, so successful in his hands but so difficult to carry out, and demanding so much specialised skill and experience, has three or four pages devoted to it; but Dr. Wingfield does not seem to have employed it himself.

The third book in our list gives in a quite fascinating form a fairly complete account of the subject from the view-point of one who has practised hypnotism for nervous and mental disorders for about fifteen years. A strong plea is put forward in favour of a much more extended recognition of the value of this treatment by qualified medical men. Dr. Hollander admits the possibilities of abuse by the unprincipled, and argues that this makes it all the more imperative that physicians, to whom reputation is dearer than life, who are dependent entirely on public opinion for their living, should alone be permitted the use of a therapeutic method, which has its dangers like anaesthetics and other powerful drugs. The early chapters deal in the plainest and most lucid style with the subconscious mind, the nature of suggestion, universal suggestibility, and auto-suggestion. All interested in getting the best out of their brains, or in bringing the brains of others up to a high and sane level, will find much valuable advice here, and in Chapter XVIII. the value of suggestion in education is dealt with more fully. One cannot but feel, however, that practically but few children of depraved tendencies or with other stigmata of degeneration can be influenced by practitioners of hypnotism. The material is so often bad to work on, and the treatment is necessarily expensive. On the other hand, in mild cases much may be done by parents or educators. "In many children, on account of their great suggestibility, only a passive state is necessary, which is easily produced, so that the objection to hypnotism fails. Indeed, severity of punishment is more likely to do harm than hypnotic sleep gently produced. How many parents and educators try to reform children by scolding and the threat of punishment, which frightens a delicate child and does harm to its nervous organisation, sometimes for its lifetime!" Would that these words could somehow be brought home to the tyrants of the schoolroom! In addition to the many pages dealing with hypnotism in all its varying forms, and its effects in various disorders, such allied subjects as clairvoyance, thought-trans-

ference, and apparitions are discussed with sympathy and common sense. Dr. Hollander believes a cure of insanity in its early stages may often be effected by hypnotism, through strengthening the volitional control, especially if such aids as tonics, electricity, hydrotherapeutics, or massage are employed; but in most cases of insanity it is almost impossible for suggestion to find an entrance into the brain, and the first efforts should be directed to producing sleep. This volume is in many respects the best treatise in English on hypnotism.

Diseases of the Heart and Aorta. By ARTHUR DOUGLASS HIRSCHFELDER, M.B., Associate in Medicine, Johns Hopkins Hospital. Pp. 632. Philadelphia and London: J. B. Lippincott Co.. 1910. Price 25s. net.

IN some respects this is a unique work on the heart. It is not merely a compilation of clinical observations and inferences, nor is it solely a review of our present knowledge of the physiology and pathology of the heart. The essential and distinctive character of the monograph, which will make it a standard work for many years to come, is the intimate co-relation of clinical phenomena with the facts ascertained in the laboratory. The author demonstrates how important the latter are for the correct appreciation of clinical signs and for the treatment of patients suffering from cardio-vascular disease. While the subject is freely illustrated by records of cases from the Johns Hopkins Hospital, and by the author's own experimental researches, he also shows how the investigations of Gaskell, Engelmann, Mackenzie, Hering, Erlanger, Gibson, Thayer, Einthoven, Tawara, and many others have led to a new and more accurate conception of the action of the heart in health, and to the nature and causes of cardiac failure.

The problems concerned with blood-pressure, the venous pulse, the electro-cardiogram, X-ray examination, and physical diagnosis are discussed in the first part of the work. The importance of all the newer methods of precision is emphasised by the number of illustrations accompanying the text. Various functional tests of cardiac efficiency are described, but the author wisely remarks that "the important question is not what the patient can do in a gymnasium, but what he can do and what he cannot do in everyday life. Each man must be fit for his own mode of life, or must be made to change it."

The general symptoms of cardiac disease and the general principles of treatment of failure of the heart are shortly but concisely described and thereafter comes the consideration of the myocardial affections, arterio-sclerosis, the valvular lesions, and congenital heart disease. The author's own observations upon experimental mitral stenosis confirm the belief that the crescendo murmur of mitral stenosis is auriculo-systolic in time. In relation to aortic insufficiency, attention

is directed to the significance of Stewart's observations. In the sections dealing with extra-systoles, the gallop rhythm, heart-block, and paroxysmal tachycardia, the records of the author's original experiments and clinical observations are quoted either to confirm or disprove current beliefs.

The book presents a more complete and modern summary of the affections of the heart than any other treatise, and the author is to be congratulated upon a splendid piece of work.

Some Common Remedies and their Use in Practice. By EUSTACE SMITH, M.D. Pp. vii.+112. Crown 8vo. London: H. K. Lewis. 1910. Price 3s. net.

ALTHOUGH considerable advances have been made in our knowledge of the causes of disease and our methods of treating diseases have been modified accordingly, and although there have been great improvements in pharmacy, there is the danger that the flood of synthetic and substitution products, which are so energetically pushed by the agents of manufacturers, may swamp some of the older remedies which have been proved to be of high value. Dr. Eustace Smith during the years 1908 and 1909 published in the *British Medical Journal* articles on "Tartarated Antimony," "Oil of Turpentine," "The Use and Misuse of Iron," "Alkalies, Opium, and Salicylate of Sodium." These papers have been brought together in the small volume before us. It is highly recommended to all who are engaged in the active practice of medicine. It may recall to the recollection of some, and introduce to the knowledge of many others, methods of using these medicines, by which they will attain results which cannot be produced by the newer drugs.

Diagnostic Methods—Chemical, Bacteriological, and Microscopical: A Text-Book for Students and Practitioners. By RALPH W. WEBSTER, M.D., Ph.D., Assistant Professor of Pharmacological Therapeutics and Instructor in Medicine in Rush Medical College, University of Chicago; Pathological Chemist at Cook County Hospital, Chicago. Pp. 641. London: Rebman, Ltd. 1909.

THE application of laboratory methods to clinical medicine has now become of such importance that a work like that of Dr. Webster's, which describes both simple and complex methods with care and detail, and discusses their clinical significance, is a welcome addition to the literature. The author writes upon the examination of the sputum, the oral, nasal, aural and conjunctival secretions, the gastric contents, fæces and urine, the blood, transudates and exudates, and milk. The work is particularly strong from the standpoint of chemical analysis,

and of the examination of the blood ; its weaker side is that concerned with bacteriological diagnosis. The chapter on the Examination of the Urine is thoroughly up to date in all respects, and we are glad to see that Heller's test is referred to as the least delicate of all the ordinary tests for albumin, and that Esbach's method of quantitative estimation is shown to be inferior and less exact than other methods which can be as readily performed. The author lays considerable stress upon the quantitative estimation of pepsin in the gastric contents, and he finds that Sahli's desmoid reaction gives fairly reliable results. The chapter on the Blood, extending to over 200 pages, is well illustrated by a number of beautiful coloured plates depicting the appearances of stained films in chlorosis, pernicious anæmia, leukanæmia, leucocythæmia, and malaria.

The Pathology of the Living, and Other Essays. By B. G. A. MOYNIHAN, M.S., F.R.C.S., Leeds. London: W. B. Saunders Co. 1910.

WE need not do more than chronicle the fact that Mr. Moynihan has collected and issued in a single volume a number of his recent papers bearing on the subject of abdominal surgery. As these have already appeared as they were delivered in the medical journals, they are familiar to our readers.

Mr. Moynihan's writings are always original and suggestive, and in the various papers here presented we have him at his best. The important contributions made to our knowledge of the pathology of the abdominal viscera, from observations made by operating surgeons on the living subject, are clearly set forth, and a strong plea is entered for further work on these lines. "The lessons to be learnt in the operating theatre are far greater in number and far outweigh in value those that can be learnt in the post-mortem room, in so far as they bear any reference to the treatment of the living."

The scientific value of these essays is enhanced by the fluency and force of their literary style, and in their present form they should be in the hands of every surgeon.

Lectures on Cosmetic Treatment. A Manual for Practitioners by DR. EDMUND SAALFELD, Berlin. Translated from the German by J. F. HALLS DALLY, M.D., with an Introduction and Notes by P. S. ABRAHAM, M.D. Pp. 178. London: Rebman, Ltd. 1910. Price 5s. net.

THIS little book is the English translation of the second German edition. Although the title might lead one to think that the subject does not come within the scope of medicine proper, one has only to

read the book to realise how much can be done for the minor skin blemishes which are so common. Diseases such as seborrhoea, acne, rosacea, and rhinophyma are discussed pretty fully. Nævi, warts, corns, hypertrichosis, loss of hair, chloasma, &c., are also considered. If the practitioner made himself better acquainted with the removal of such conditions, he would do much towards preventing his patients resorting to all sorts of quack remedies. In this book he will find many useful hints about those skin conditions which, although not in themselves serious, are often, especially in the female sex, a very serious source of mental worry.

The Work of the Digestive Glands. Lectures by Professor I. P. PAVLOV. Translated by W. H. THOMPSON, Sc.D., M.D., F.R.C.S. Second English Edition. Illustrated. Pp. 266. London: Charles Griffin & Co., Ltd. 1910. Price 10s. 6d.

THIS second edition of Professor Pavlov's celebrated lectures on Digestion will be warmly welcomed. It contains that most valuable and permanent work on digestive secretions which was made accessible to British readers in 1902 by Professor Thompson, and which is now supplemented by later work from the St. Petersburg laboratory. But, in addition, two new chapters on the Muscular Movements of the Alimentary Canal have been added by the translator. These greatly enhance the completeness of the book, adding to a study of digestive secretion that of the mechanism of food movement through the alimentary canal. Knowledge of the intestinal motor functions has been greatly advanced in recent years by radiosopic methods of investigation, and in this connection the valuable work of Cannon, Hertz, and others is summarised. The book, therefore, presents a complete survey of the functions of the alimentary tract, secretory and motor, and is of standard value both to the physiologist and the physician.

NOTES ON BOOKS.

WE have pleasure in noting the appearance of a second edition of Mr. W. J. de C. Wheeler's *Student's Handbook of Operative Surgery* (Baillière, Tindall & Cox). It contains within reasonable compass, and in a form easily assimilated, all that the student requires to guide him in the class of operative surgery.

Professor Strauss's brochure, *Praktische Winke für die chlorarme Ernährung*, is to a great extent a compilation from authoritative sources. The technique of the chlorine-free and chlorine-poor diet is

discussed, and the sodium chloride analysis of almost every conceivable form of food and drink is given. The diseases in which this form of dietetic treatment is recommended are briefly outlined. The author's method of estimating the urinary chlorides and determining the degree of chlorine tolerance are described.

The practical value of this little book for the practitioner is greatly enhanced by the full consideration which is given to the modes of preparing foods for the table, the subject being dealt with in the exact manner of books on cookery.

Dr. G. E. Herman's *Difficult Labour, a Guide to its Management* (Cassell & Co.) is an excellent guide to difficult labour, as it is concise, practical, supported by ample clinical experience, and seasoned by common sense, the most valuable of literary condiments. In symphysiotomy the author advises Ayres's subcutaneous method; pubiotomy is not recommended.

We are glad to see Dr. Herman has reproduced some of Barnes's admirable illustrations. Altogether this is an excellent book.

In *Golden Rules of Obstetric Practice*, by W. E. Fothergill, M.A., B.Sc., M.D. (Sixth Edition), (John Wright & Sons, Ltd.), we have a number of rules—golden rules—intended for the guidance of the young practitioner, and giving him, in brief, sententious advice on various obstetric conditions normal and abnormal. Much of the advice is sound, but a good deal of it unnecessary, we hope, as, for instance, "Always refuse any alcoholic drink which may be offered you in the patient's house during labour" (p. 22). If this advice has to be given, it is shorter in Matthews Duncan's form, "Never drink at a midwifery, gentlemen!" Why had Duncan not his Boswell?

At page 38 we find the following:—"9. If version is impossible, decapitate, or divide the spine in the most accessible place. Deliver the body by the legs. . . ."

If, however, one decapitates, it is easier to deliver by pulling on the presenting arm. If one does spondylotomy, it is of course on a premature impacted child and to favour spontaneous evolution.

The condensed form in which some of the rules are given renders them sometimes somewhat unintelligible. Thus at page 7 we have:—"2. Think twice before saying that a woman is pregnant to any person other than the patient herself." One sees what the author means, but, strictly, it may be read as an aphorism to prevent the practitioner accusing a woman of self-impregnation. Briefly it might be put thus—"Keep the fact of a patient's pregnancy to yourself."

We have no doubt that with increasing practice the author will modify the absoluteness of some of his dicta. Thus at page 38—"1. Remember that in normal labour there should be no bleeding until

after the child is born," suggests that one may expect hæmorrhage in the third stage of a normal labour. "Hydraminos," at page 21, is reminiscent of Mrs. Gamp and her umberellar. *Golden Rules* intelligently read will certainly give the practitioner instruction and amusement in a tedious first stage.

Dr. Alexander Haig's *Uric Acid in the Clinic* (J. & A. Churchill) is almost entirely devoted to a detailed record of the clinical evidence which has led the author to the position defined by him in his larger work, *Uric Acid as a Factor in the Causation of Disease*. Under separate headings, Headache, Epilepsy, Neurasthenia, &c., brief clinical histories are given, and, in most cases, determinations of blood-pressure, capillary reflex, blood colour-index, pulse-rate, and other data are included. Unfortunately, in these synopses, matters of fact, both historical and clinical, are mixed up with highly biassed interpretations, and though the latter are detached in italicised parentheses, it is not easy for the reader, who approaches the subject with an open mind, to extricate what is evidence from what is merely opinion. But the book forms a most important supplement to the author's main work, and furnishes the clinical data by which the soundness of his position must be tested and eventually judged.

There has been issued, by order of the Council of the Royal College of Surgeons of England, an *Illustrated Guide to the Museum* (Taylor & Francis). Professor Arthur Keith, the conservator of the museum, is the author of it, and he is to be congratulated on having provided a guide that is sure to be found of great use and interest to those visiting the collection under his care. The book is written for those who make their first visit to the museum and desire a guide to the general arrangement of the specimens, but at the same time serves as an indicator of the situation of, and chief points of interest in, any particular section.

The numerous references to points of historical and general interest make the book most interesting reading, and at the same time intelligible to the educated lay visitor in search for profitable knowledge.

In this, its third, edition, *Vaccine Therapy, its Theory and Practice*, by R. W. Allen, M.D. (H. K. Lewis), has been entirely re-written and brought up to date. All the important changes in our knowledge of vaccine therapy since the last edition appeared two years ago, have been added, so that the book is now about 40 pages larger than formerly. It is still, however, of a reasonable size. The value of vaccine treatment in medicine and surgery is discussed under the different organisms, and a very rational view taken of the benefits likely to result from such treatment. The book is interesting and

practical, and should prove very useful both to the specialist and the general practitioner.

This volume of the *International Clinics*, edited by Henry W. Cattell, M.D. (J. B. Lippincott Co.), contains a series of original articles on various branches of medicine, surgery, and gynaecology. There is also an epitome of the most important advances which have been made in treatment, medicine, and surgery during the year 1909. The subjects treated are numerous and varied. There are several coloured plates in addition to numerous photographs. The articles on pellagra are especially well illustrated. It is a volume by which the busy practitioner can get the latest information on all branches of medical and surgical practice, and we would commend its perusal as an easy and interesting method of keeping oneself up to date.

The title of Dr. B. Lewis's *Medical Vademecum in German and English* (J. & A. Churchill) does not make clear the character of the work. In the introduction Dr. Lewis explains that the purpose of his book is "to make as easily accessible as possible to German and English physicians the medical vocabulary of both languages."

This he attempts to do, and, in our opinion, with a remarkable degree of success, by giving a series of short practical papers on a variety of subjects of present-day interest in German, with a literal translation in English on the opposite page. So skilfully has this been done that it is never necessary to use a dictionary for either language. As the papers chosen include all the departments of medicine and surgery, the reader is introduced to the vocabulary of every subject.

It is impossible in a short notice to convey a satisfactory idea of the scope and value of this novel work, and we must content ourselves by saying that we know of no better means of readily acquiring a working knowledge of medical German than by studying its pages.

Dr. Westland's book, *The Wife and Mother* (Charles Griffin & Co., Ltd.), having reached a sixth edition, must be regarded as an established favourite with the women and mothers of the day. It contains a great deal of useful knowledge, imparted clearly and correctly, regarding confinement cases, diseases peculiar to women, the feeding and care of healthy infants, and the management of the common maladies of children. The author is to be congratulated on the success his book has achieved.

GENERAL INDEX.

A		PAGE			PAGE
ADDIS, T., The coagulation time of the blood in disease	38		FRASER, J. S., A case of septic (otitic) thrombosis of the jugular bulb and internal jugular vein	60	
Anæsthesia, On local. By August Bier	103		GREIG, DAVID M., A case of congenital scoliosis due to the interposition of half an extra vertebra associated with a thirteenth rib	236	
Arthritis and its treatment, Gonococcic. By William Murrell	298		HODSDON, JAMES, Case of sarcoma of brain two years and four months after operation	235	
B			KINMONT, P., Case of unusually large gall-stone impacted in common bile duct	335	
Bacillus coli infection of the urinary tract. By M. Douglas	533		MILES, ALEXANDER, Case of calculus of the bladder removed by suprapubic cystotomy in a girl æt. nine	141	
BEATTIE, J. M., and J. ARTHUR HALL, An unusual case of chronic interstitial pneumonia	199		OLIVER, JAMES, Reports of some select cases of abdominal section in gynæcological practice	143	
BIER, Professor AUGUST, On local anæsthesia, with special reference to vein anæsthesia	103		THOMSON, ALEXIS, Pistol-shot wound of the abdomen	55	
Bier's treatment by venous hyperæmia. By David MacEwen	405		THOMSON, ALEXIS, Ureteral calculus removed by the transperitoneal operation	139	
Blindness, The causes and prevention of. By George Mackay	124		THOMSON, ALEXIS, Complete extirpation of pancreatic cyst	547	
Blood in disease, The coagulation time of the. By T. Addis	38		WALLACE, DAVID, A large tumour in a girl aged five and a half years — nephrectomy — recovery	140	
BOYD, FRANCIS D., Discussion on the artificially prepared hypnotics: their use and possible abuse	7		Coagulation time of the blood in disease, The. By T. Addis	38	
BRUCE, LEWIS C., The value of physical examination in mental diseases	523		COMRIE, JOHN D., Early knowledge regarding phthisis	19	
C			COMRIE, J. D., and J. S. FRASER, The frequency of sphenoidal sinus suppuration	450	
Cardiac enlargement by surgical measures, The relief of. By G. A. Gibson	293		Conference of the British Hospitals' Association. By William Robertson	470	
Cell life and the life cell in animal physiology. By John Strachan	515		D		
Cerebral crises and seizures as occurring in arterio-sclerotics, The significance of transient. By James D. Heard	417		Dextrocardia, Congenital. Cor trilobulare biventriculare. By W. E. Foggie	428	
Clinical medicine teaching, A working plan of. By William Russell	309		DICK, R. J., Acute pancreatitis, considered in relation to three cases occurring in general practice	217	
Clinical Records—					
COTTERILL, J. M., Traumatic arterio-venous aneurism of right orbit	54				
EASON, J., and PATERSON, J. V., A case of disease of the pituitary, with ophthalmological report	56				

	PAGE		PAGE
DINGWALL FORDYCE, A., The care of the infant and young child (to five years) in Edinburgh	208, 328	G	
DOUGLAS, M., Bacillus coli infection of the urinary tract	533	Gastric and duodenal surgery, Notes on. By J. Crawford Renton	542
E		Gastro-jejunal and jejunal ulceration following gastro-enterostomy. By D. P. D. Wilkie	316
Editorial Notes and News:—		GIBSON, G. A., The relief of cardiac enlargement by surgical measures	293
The General Medical Council—		Gonococcic arthritis and its treatment. By William Murrell	298
The late Professor Koch—			
Alcohol and Offspring—		H	
Eugenics and Arithmetic—		HALL, J. ARTHUR, and J. M. BEATTIE, An unusual case of chronic interstitial pneumonia (diffuse bilateral pulmonary fibrosis following (?) influenza)	199
The Sterilisation of the Degenerate and of the Habitual Criminal—Recent Appointments	1	HAULTAIN, F. W. N., Some practical points in the life-history of uterine fibromyomata	133
Medical Education in the United States and Canada—Scottish Universities' Grant—Child Life in Edinburgh—Conferences—The American Society of Clinical Surgery—The late Captain E. D. Simson, I.M.S.—Appointments—Royal College of Physicians of Edinburgh, Royal College of Surgeons of Edinburgh, and Royal Faculty of Physicians and Surgeons of Glasgow	97	HEARD, JAMES D., The significance of transient cerebral crises and seizures, as occurring in arteriosclerotics	417
Florence Nightingale—The Research Defence Society—"The Health of the Nations"—The Post-Graduate Course—International Congress of Anatomists	193	Hypnotics, Discussion on the artificially prepared. By Francis D. Boyd	7
The Profession of Medicine—Clinical Teaching in Edinburgh—The Edinburgh Post-Graduate Course—Appointments	289	I	
The New Medical Ordinances—The New Clinical Laboratory—The Proposed Composition Fee—The Late Dr. Stirling—Appointments	401	Infant and young child, The care of. By A. Dingwall Fordyce	208, 328
The King Edward Memorial—The Centenary of Dr. John Brown—The G. M. C.—Limited Cliniques	497	L	
Education, Medical	340	LAWRENCE, H. RUTHVEN. Scopolamine-morphine as an obstetric anæsthetic	461
F		M	
Fibromyomata, Uterine. By F. W. N. Haultain	133	MAC EWEN, DAVID, Bier's treatment by venous hyperæmia	405
FOGGIE, W. E., Congenital dextrocardia. Cor trilobulare biventriculare	428	MACKAY, GEORGE, The causes and prevention of blindness	124
FRASER, J. S., and J. D. COMRIE, The frequency of sphenoidal sinus suppuration	450	Medical Education—	
		Medical education in Scotland	340
		Royal Navy Medical Service, The	361
		Royal Army Medical Corps	363
		Indian Medical Service	365
		Medical appointments in the Colonies	367
		Mental diseases, The value of physical examination in. By Lewis C. Bruce	523
		MURRELL, WILLIAM, Gonococcic arthritis and its treatment	298
		O	
		Obituary—	
		Claud Muirhead	62
		David H. Stirling	518
		Thomas F. S. Caverhill	550

P	PAGE		PAGE
Pancreatitis, Acute. By R. J. Dick	217	Societies, Meetings of—	
Passes, Lists of	449, 460	Edinburgh Medico-Chirurgical	
Phthisis, Early knowledge regard-		Society	65, 68, 551
ing. By John D. Comrie	19	Edinburgh Obstetrical Society	149, 154
Physical examination in mental		Forfarshire Medical Association	552
diseases, The value of. By		Sphenoidal sinus suppuration, Fre-	
Lewis C. Bruce.	523	quency of. By J. D. Comrie and	
Pneumonia, An unusual case of		J. S. Fraser	450
chronic interstitial. By J.		Spirosal	496
Arthur Hall and J. M. Beattie .	199	STRACHAN, JOHN, Cell life and the	
		life cell in animal physiology	515
R		T	
RENTON, J. CRAWFORD, Notes on		THOMSON, ALEXIS, Le rheumatisme	
gastric and duodenal ulcer . .	542	tuberculeux	503
Rheumatisme tuberculeux, Le.			
By Alexis Thomson	503	U	
ROBERTSON, WILLIAM, Conference		Urinary tract, Bacillus coli infec-	
of the British Hospitals' Asso-		tion of the. By M. Douglas . .	533
ciation	470	Uterine fibromyomata, Some prac-	
RUSSELL, WILLIAM, A working plan		tical points in the life-history of.	
of clinical medicine teaching .	309	By F. W. N. Haultain	133
S		W	
Scopolamine-morphine as an ob-		WILKIE, D. P. D., Gastro-jejunal	
stetric anæsthetic. By H. Ruth-		and jejunal ulceration following	
ven Lawrence	461	gastro-enterostomy	316

CRITICAL SUMMARIES AND ABSTRACTS OF RECENT LITERATURE.

Dermatology.

	PAGE
W. Allan Jamieson and R. Cranston	
Low	265, 488

Diseases of Children.

A. Dingwall Fordyce	174
G. H. Melville Dunlop	482

Diseases of the Throat, Nose, and Ear.

J. S. Fraser and F. E. Reynolds .	186
A. Logan Turner and W. G. Porter	381

Infectious Diseases.

Claude B. Ker	377
-------------------------	-----

Medical Jurisprudence.

Harvey Littlejohn and J. H. Harvey	
Pirie	86

Medicine.

J. D. Comrie	368
J. S. Fowler	69, 238, 471
J. Souttar McKendrick	157
W. T. Ritchie	553

Mental Diseases.

James Middlemass	179
----------------------------	-----

Obstetrics and Gynecology.

	PAGE
A. H. F. Barbour and B. P. Watson	78
J. W. Ballantyne	247, 562

Ophthalmology.

Angus MacGillivray	260
W. G. Sym	486

Pathology.

James Miller	82
Theodore Shennan	253

Physiology.

T. H. Milroy	566
------------------------	-----

Surgery.

George Chiene	478, 557
Jas. M. Graham	375, 376, 481, 561
James Lochhead	76, 78, 170, 171, 243, 374, 375, 480, 559, 560
A. A. Scot Skirving	169, 476
J. W. Struthers	73
Henry Wade	73, 75, 373
D. P. D. Wilkie	172, 173,

Therapeutics.

F. Charteris	269
F. D. Boyd	568

REVIEWS OF BOOKS.

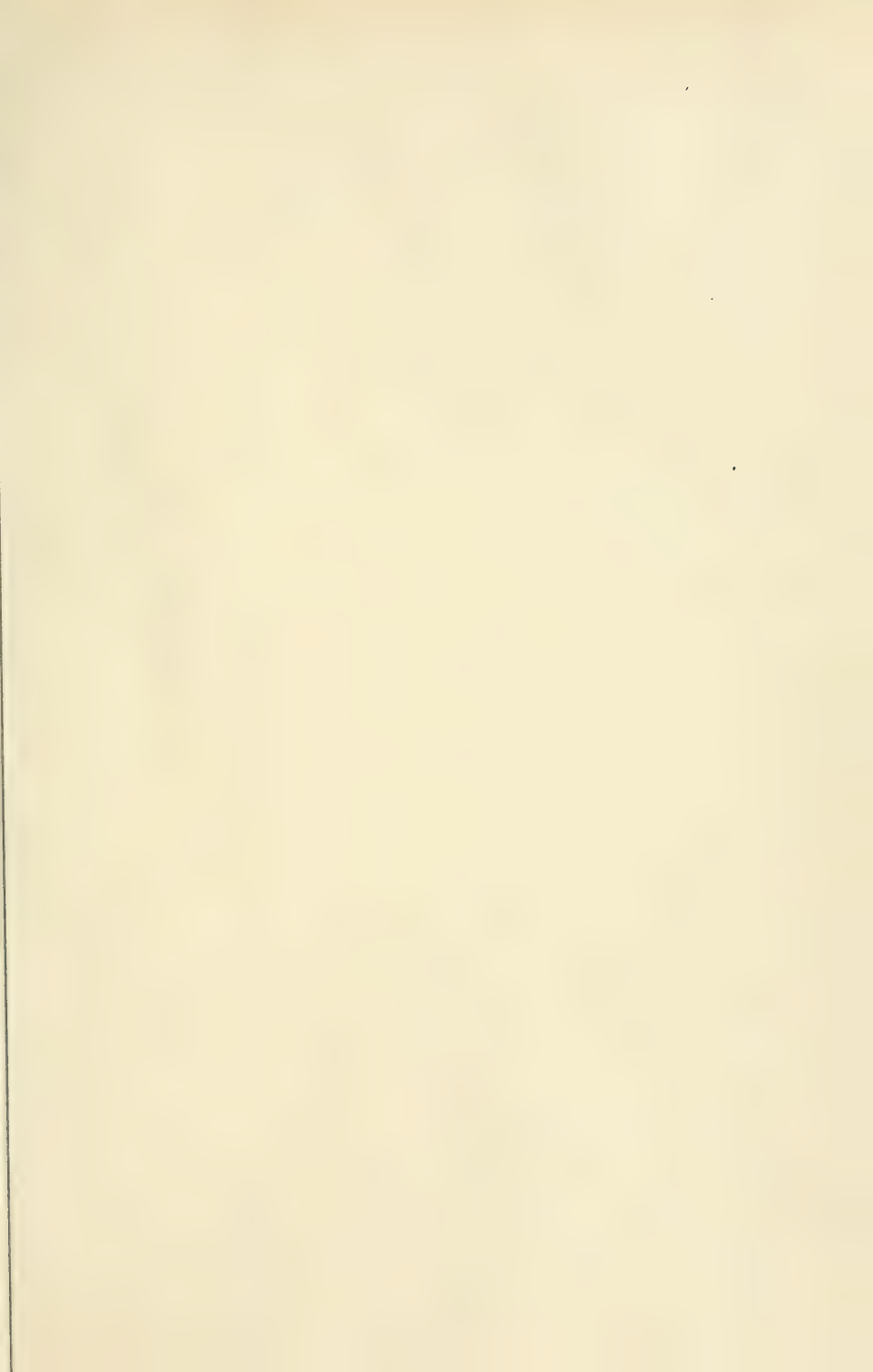
	PAGE		PAGE
Abdominal Surgery, Contributions to. By the late Harold Leslie Barnard	393	Ear, A Text-Book of the Diseases of the. By Prof. A. Politzer	387
Anæsthesia in Dental Surgery. By Thomas D. Luke	96	Ear, Diseases of the. By Richard Lake	580
Anatomo-Cliniques, Etudes. By Dr. Raymond Tripier	277	Ear and its Diseases, The. By Albert A. Gray	583
Anatomy and Pathology, Living. By Thomas Morgan Rotch	277	Eléments d'Obstétrique. Par le Dr. V. Wallich	397
Cancer, The Nature of. By John Clay	285	Emergencies of General Practice. By Percy Sargent	495
Carbohydrates and the Glucosides, The Simple. By E. Frankland Armstrong	276	Ernährung, Praktische Winke für die Chlorarme. By Professor Strauss	589
Catalogue of the Library of the Surgeon-General's Office, U.S. Army, Index. Vols. XIII., XIV.	285	Eye, Atlas of External Diseases of the. By Professor Greeff	192
Chemistry, A Manual of. By Arthur P. Luff	400	Gall-Stones: Their Complications and Treatment. By A. W. Mayo Robson	395
Child, The. By Albert Westland	94	Geburtshilfe, Die Operative. By Hermann Fehling	96
Children, The Diseases of. By J. F. Goodhart	389	Genito-Urinary Surgeons, American Association of. Vols. III., IV.	287
Chlorarme Ernährung Praktische Winke für die. By Professor Strauss	589	Gynecology. Practical Medicine Series, The	95
Clinics, International. Edited by H. W. Cattell	592	Gynecology, Medical. By Samuel Wyllis Bandler	94
Colon, Diseases of the. By P. Lockhart Mummery	392	Heart and Aorta, Diseases of the. By A. D. Hirschfelder	586
Consumptive after Sanatorium Treatment, The Expectation of Life of the. By Noel D. Bardswell	279	Heredity, The Laws of. By G. Archdall Reid	273
Cosmetic Treatment, Lectures on. By Edmund Saalfeld	588	Hygiene, The Principles of. By D. H. Bergey	399
Dental Surgery, Anæsthesia in. By Thomas D. Luke	96	Hypnotism, The Suggestive Power of. By L. F. Winslow	584
Diagnostic Methods. By Ralph W. Webster	587	Hypnotism, An Introduction to. By H. E. Wingfield	584
Dictionary of Terms Used in Medicine, Hoblyn's. By John A. Price	286	Hypnotism and Suggestion. By Bernard Hollander	584
Digestive Glands, The Work of the. By Prof. I. P. Pavlov	589	Hypnotism and Treatment by Suggestion. By J. Milne Bramwell	280
Drugs and the Drug Habit. By Harrington Sainsbury	388	Labour, Difficult, A Guide to its Management. By G. E. Herman	590
		Laryngoskopie, Bronchoskopie und Oesophagoskopie, Die direkte. By Prof. Brunings	581

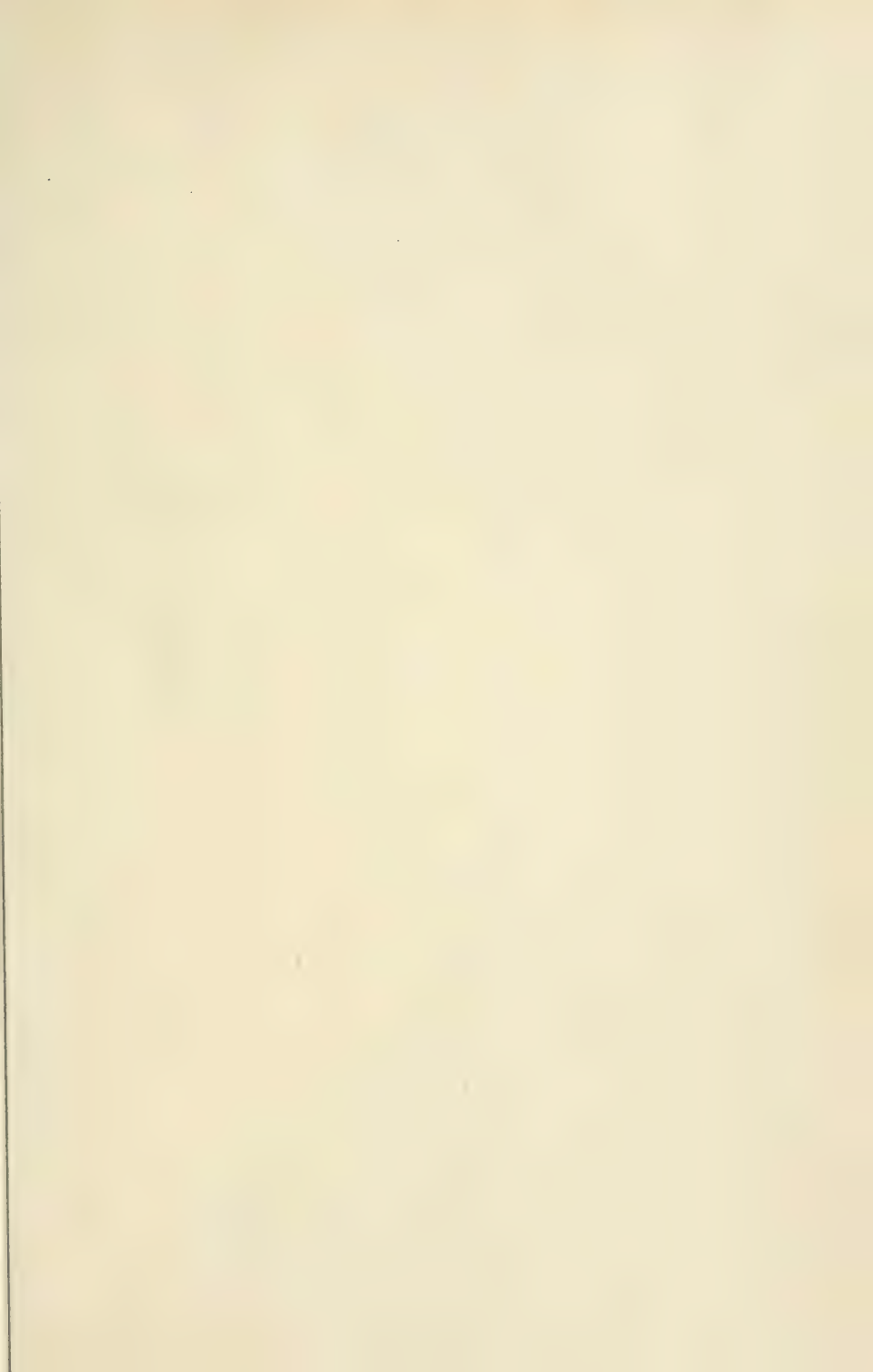
	PAGE		PAGE
L'Hypophyse et la Médication Hypophysaire. By Arthur Delille	278	Other Essays. By B. G. A. Moynihan	588
International Clinics. Edited by H. W. Cattell	592	Pathology, Practical. By G. Sims Woodhead	576
Ionic Surgery in the Treatment of Cancer. By G. Betton Massey	282	Pediatric Society, Transactions of the American. Vol. XXI.	287
Meat Inspection, A Practical Guide to (Walley). By Stewart Stockman	397	Physiology, A Manual of. By G. N. Stewart	579
Medical Diagnosis. By Charles Lyman Greene. 3rd Edition	288	Physiology, Practical. Edited by M. S. Pembrey	580
Medical Jurisprudence and Toxicology, A Text-Book of. By John Glaister	390	Post-Mortem Manual. By C. R. Box	578
Medical Vademecum in German and English. By B. Lewis	592	Psychologie pathologique, Traité International de	91
Medicine, A System of. Vol. VII. By Osler and McCrae	572	Public Health. Parts I. to V. Catechism Series. Revised by W. Robertson	284
Medicine, A System of. Vol. VII. By Allbutt and Rolleston	573	Public Health: Sanitary Law and Practice. By W. Robertson and Charles Porter	395
Meteorology, Practical and Applied. By Sir John Moore	400	Refraction, Errors of. By Charles Blair	96
Midwifery, Manual of. By Henry Jellett	94	Remedies, Some Common. By Eustace Smith	587
Midwifery, The Practice of. By Alfred Lewis Galabin and George Blacker	398	Rhinology. By Patrick W. Williams	582
Museum of the Royal College of Surgeons of England, Illustrated Guide to the	591	Sanitary Law and Practice. By W. Robertson and Charles Porter	395
Nose and Throat, A Handbook of the Diseases of the. By Eugene S. Yonge	284	Scarlet Fever, A Plea for the Home Treatment and Prevention of. By Robert Milne	386
Obstetric Practice, Golden Rules of. By W. E. Fothergill	590	Serums, Vaccines, and Toxines in Treatment and Diagnosis. By Wm. C. Bosanquet	93
Obstetrics, A Text-Book of. By Barton Cooke Hirst	398	Sight-Testing made Easy. By W. Wright Hardwicke	387
Obstetrics: Practical Medicine Series, The	95	Spino-cerebellarem Systeme, Die Bedeutung der. By Robert Bing	496
Open-Air Treatment at Home. By Stanley H. Bates	279	Surgery of the Brain and Spinal Cord. By Professor Fedor Krause. Vol. I.	283
Operative Cases, Preparatory and After-Treatment in. By H. A. Haubold	394	Surgery, Emergency. By John W. Sluss. 2nd Edition	288
Operative Surgery, Manual of. By John Fairbairn Binnie. Vol. I.	282	Surgery, Ionic. By G. Betton Massey	282
Operative Surgery, Student's Handbook of. By W. J. de C. Wheeler	589	Surgery, Manual of Operative. By John Fairbairn Binnie. Vol. II.	282
Ophthalmology, A Practical Treatise on. By L. Webster Fox	191	Surgery, Operative. By W. J. de C. Wheeler	589
Paris Medical School, An English Handbook to the. By A. A. Warden	286	Surgery, Urgent. By Felix Lajare	393
Pathology of the Living, and		Surgical Diagnosis. By Alexander Bryson Johnson	281
		Surgical Handbook. By Caird and Cathcart. 15th Edition	287
		Theoretische Grundlagen zum	

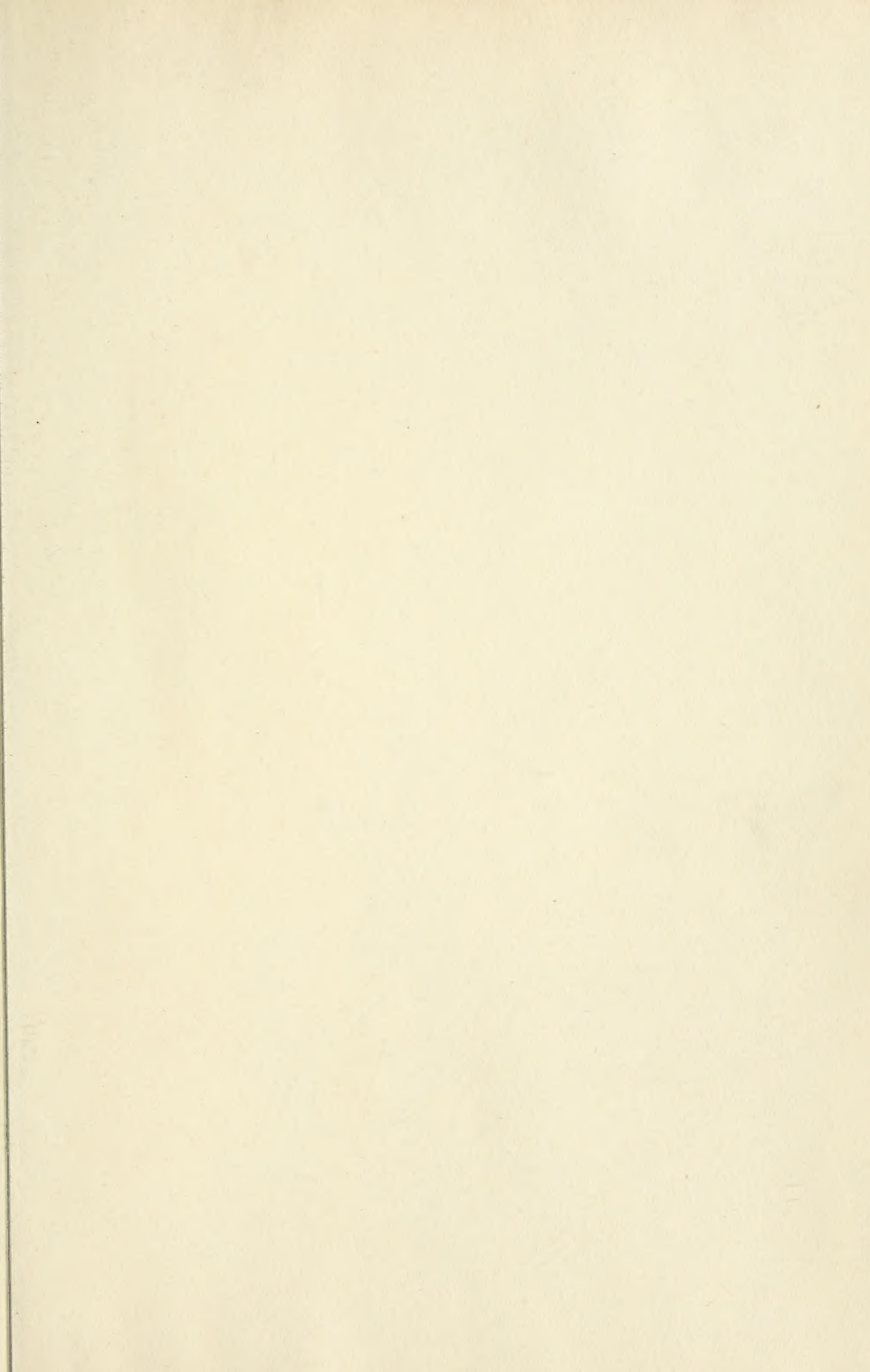
	PAGE		PAGE
Praktisch-Chemischen Unterricht der Mediziner. By Artur Korschegg	388	Uric Acid in the Clinic. By Alex. Haig	591
Therapy, Vaccine. By R. W. Allen	591	Urological Association, Transactions of the American. Vol. III.	287
Tropical Medicine, Manual of. By Aldo Castellani and Albert J. Chambers	390	Vaccine Therapy. By R. W. Allen	591
Tuberculosis. Edited by A. C. Klebs	575	Vademecum in German and English, Medical. By B. Lewis	592
Tuberculosis, Pulmonary. By Sherman Bonney	494	Wife and Mother, The. By Dr. Westland	592

LIST OF ILLUSTRATIONS.

	PAGE
Coagulation Time of the Blood in Disease—	
5 <i>Charts</i>	38
Traumatic Arterio-Venous Aneurism of Right Orbit—	
1 <i>Plate</i>	54
A Case of Disease of the Pituitary—	
2 <i>Charts</i>	58
2 <i>Figs.</i>	59
Septic (Otitic) Thrombosis of the Jugular Bulb—	
1 <i>Chart</i>	61
Dr. Claud Muirhead—	
1 <i>Photograph</i>	62
Local Anæsthesia—	
6 <i>Figs.</i>	103
Case of Calculus of the Bladder—	
3 <i>Figs.</i>	141
Case of Chronic Interstitial Pneumonia—	
6 <i>Figs.</i>	199
Case of Congenital Scoliosis—	
1 <i>Photograph</i>	236
1 <i>Radiogram</i>	236
The Relief of Cardiac Enlargement—	
1 <i>Chart</i>	293
Gastro-Jejunal and Jejunal Ulceration—	
3 <i>Plates</i>	316
Case of Gall-Stone impacted in Common Bile Duct—	
1 <i>Fig.</i>	335
Congenital Dextrocardia—	
2 <i>Plates</i>	428
1 <i>Fig.</i>	430
Sphenoidal Sinus Suppuration—	
3 <i>Plates</i>	450
Gastric and Duodenal Ulcer—	
1 <i>Fig.</i>	542









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